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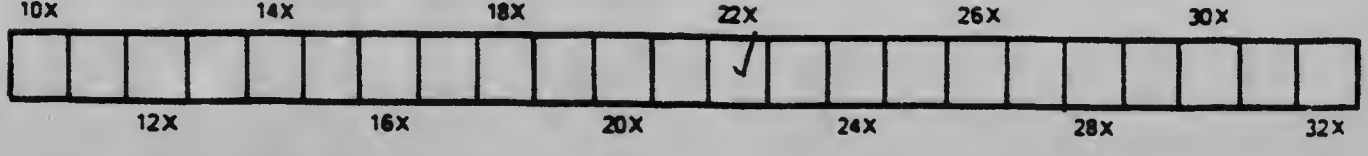

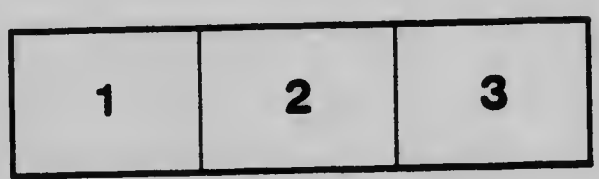

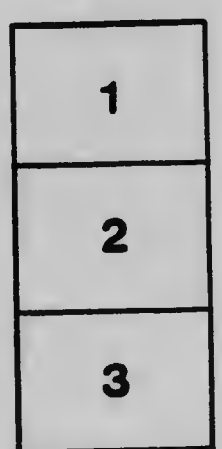

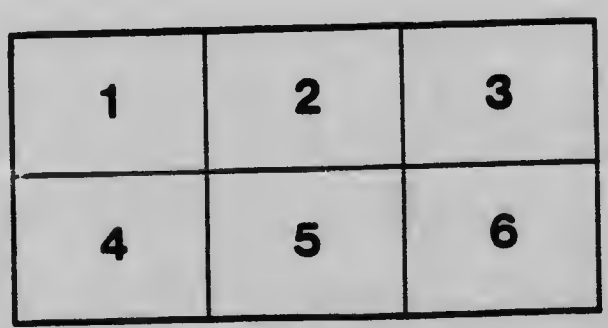

LECTURES ON THE ACUTE ABDOMEN

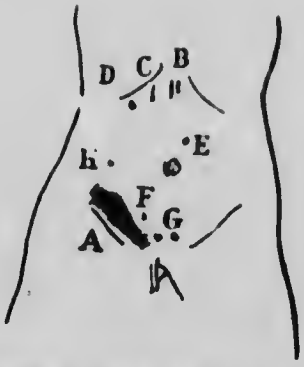

FIG. 1.--Diagram to illustrate by shading the relative proportions of various perforations of the hollow viscera. Appendix, A. Gastric, B. Duodenal, C. Biliary, D. Jejunal, E. Typhoid, F. Tubal, G. Stercoral, H.

CLINICAL LECTURES
ON THE
ACUTE ABDOMEN

BY

WILLIAM HENRY BATTLE, F.R.C.S.

SURGEON TO ST. THOMAS'S HOSPITAL, AND JOINT LECTURER ON SYSTEMATIC SURGERY IN THE MEDICAL SCHOOL; FORMERLY SURGEON TO THE ROYAL FREE HOSPITAL; ASSISTANT SURGEON TO THE EAST LONDON HOSPITAL FOR CHILDREN; HUNTERIAN PROFESSOR OF SURGERY AT THE ROYAL COLLEGE OF SURGEONS OF ENGLAND; "ORATOR" OF THE MEDICAL SOCIETY OF LONDON, 1910; AUTHOR (WITH MR. E. M. CORNER) OF "THE SURGERY OF THE DISEASES OF THE APPENDIX VERMIFORMIS AND THEIR COMPLICATIONS," ETC.

TORONTO

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PREFACE

It has been suggested that I should place the following lectures, which were given in the Clinical Theatre at St. Thomas's Hospital, in book form, so that they may reach larger audiences than those to which they were delivered, and also complete the subject, to some extent, for those who were not present on the occasions when all of them were given. For some time I have refrained from doing so, but the increasing importance of the subject, and the improved results that are met with when the sufferers from most of the surgical catastrophes included in their scope are submitted to early operation, has induced me to do it, in the hope that some good may ensue.

So far as possible the cases related have been treated aseptically, and without unnecessary multiplication of instruments, for if the practitioner gets the idea that he cannot operate without someone's special bobbin, clamp, or suture needle, he may postpone operation, and the patient in all probability lose his life. Prompt operation must follow on diagnosis, and there is usually no time for the removal of the patient to a surgical home if more than an hour or two will be lost by doing so.

In all the operations silk was used for sutures and ligatures; No. 1 is the size which is most frequently employed and generally useful, with fishgut sutures for the skin. I am strongly of opinion that catgut should not be used in acute abdominal

cases; it is apt to soften and yield too quickly should any strain be placed on it. In all abdominal cases it is best to use silk; some may recollect the statement of Kocher that in the clinique of Madelung over 100 abdominal cases had burst their wounds open because of the unreliability of catgut. Silk is safe, and can be quickly and readily sterilised.

June, 1910.

SYNOPSIS

I.—THE INFLUENCE OF THE APPENDIX VERMIFORMIS AND ITS DISEASES

Importance of the subject—Peritonitis—Value of individual symptoms—Local and general—Character of the pulse most important—Illustrative cases—Necessity for careful observation—Danger of a suppurative attack during pregnancy—Empyema of the appendix—Rupture of abscess into general peritoneal cavity.

II.—THE TREATMENT OF ACUTE APPENDICITIS WITH PERITONITIS

The choice of anæsthetic—Position of incision—"Acute abdominal conflux and incision of incidence"—Drainage generally the safest—Collapse—Toxæmia—Value of saline infusion—Position—Vomiting after operation—Use of purgatives and enemata—Distension—Fæcal fistula—Black vomit—Heart failure.

III.—PATHOLOGICAL PERFORATIONS OF THE DIGESTIVE TRACT

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PERFORATION OF ULCERS OF THE DUODENUM: Difficulty in diagnosis from acute appendix mischief—Reason for this—Importance of examining the pelvis.

PERFORATIONS OF GASTRO-JEJUNAL AND JEJUNAL ULCERS: Always following gastro-enterostomy—Nearly always the anterior method—Improvement of this operation by the Mayos—"Posterior no loop" the best—Illustrative cases—Occasionally no drainage required.

PERFORATIONS DURING THE COURSE OF TYPHOID FEVER: Symptoms—Patients under observation—Peritonitis without perforation—Illustrative cases—Character of the ulcers—Excessive effusion into the peritoneum during the course of typhoid.

PERFORATIONS OF STERCORAL ULCERS: Ulcers secondary to other disease of the large bowel—Their rarity—Illustrative cases—Treatment—Difficulty of cleansing peritoneum and of treating original disease.

IV.—ACUTE INTESTINAL OBSTRUCTION

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Embolism and Thrombosis of Mesenteric Vessels: Association with cardiac disease—Intestinal hæmorrhage—Embolism elsewhere—Treatment.

Perforations and Acute Inflammation of the Gall-Bladder: Symptoms—History of colicy attacks—Symptoms arising in the liver region—Illustrative cases—Difficulty in diagnosis.

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CLINICAL LECTURES ON THE ACUTE ABDOMEN

I

THE INFLUENCE OF THE APPENDIX VERMIFORMIS AND ITS DISEASES ON THE PRODUCTION OF THE ACUTE ABDOMEN

THERE is no department of surgery which demands greater consideration than that which I propose to discuss, for it comprises a group of cases some of which will certainly cause you much

FIG. 2.—Acute appendix—(24 hours)—(pelvic). Contains concretion at A, which blocks the passage like a ball-valve. The distal portion is gangrenous in patches. The highly-septic contents partly escaped at B, where a patch has given way. Female, aged 15.

trouble and anxiety in future life. It is of the greatest importance, therefore, that you should have a good working knowledge of this subject from the clinical standpoint.

At one time all we could do was to follow acute abdominal cases to the post-mortem room, for they almost invariably went there; but with increased knowledge of the various conditions on which "the acute abdomen" depends, a better estimation of the

value of local signs and symptoms, and a satisfactory operative technique, we now save many who in comparatively recent years would have been condemned to death from the manifestation of the first symptom. Upon your early recognition of the importance of symptoms many a life may depend; for whilst our medical papers show wonderful instances of recovery from advanced and apparently hopeless states of disease, which give encouragement to us, they do not record the numerous others which have not responded to treatment equally skilful, but applied too late.

On thinking over the subject for a clinical lecture it seemed to me that it would be an advantage to recall some of the more important cases of acute abdominal disease which have been in the hospital under my charge, and, many of them, under your observation, especially choosing those in which operation revealed a definite lesion which could be regarded as the cause of a condition, the treatment of which led to the saving of the life of the individual.

In the early stage of acute invasion of the peritoneum, or a serious lesion of it, there will be the signs of "peritonism"—that is, the patient will suffer from shock, local pain, and vomiting. There is then an interval of varying duration, when the powers of the individual are being fully employed in rallying from the shock, combating the invasion, and limiting its spread. Probably a peritonitis will immediately commence, and other symptoms be superadded as the inflammation extends and the toxins produced by the invading hordes of bacteria become to a certain extent absorbed.

An abstract from "Diseases of the Vermiform Appendix and their Surgical Complications"[1] may be made to give you an idea—a general idea—of what the "acute abdomen" is like when the earlier symptoms have been misunderstood: "The general symptoms are those of a person who is really ill, unless the signs are obscured by the injudicious administration of morphia. The face is almost always anxious-looking. The pulse is increased in rapidity, the respirations are slightly more frequent than normal, and shallower, the respiratory movements being chiefly costal. The abdomen, to which the attention is mainly called, is distended, more or less motionless, tender on

[1] Battle and Corner.

palpation, sometimes also on percussion, and often presents the signs of free fluid, such as dulness in the flanks, which shifts on movement. Vomiting is almost invariably present, and, after that of the onset, may pass off a little, only to become distressing later. The tongue is usually furred, and the breath often foul. The bowels are almost invariably without action, neither fæces nor flatus being passed. In some cases the onset of the attack is accompanied by a diarrhœa, often offensive; or a looseness of the bowels may be a late symptom, and is then called 'septic diarrhœa.' But there is always some difficulty in the passage of the contents of the alimentary canal. A rectal examination should always be made, although in the majority of cases it yields a negative result. The urine is usually scanty; at first normal, later it may contain albumin, but rarely blood." This description may appear inadequate, and it is necessarily so. There are hardly any two cases that are alike in the exact cause of the sudden illness and in the resistance of the individual. So that in one patient the general symptoms are of the greatest importance, and must be relied upon as an indication for treatment, whilst in another the local signs indicate the dangerous nature of the illness.

You will naturally ask, what are the signs and symptoms to be specially noted in any case coming under care with this history of sudden abdominal pain, shock, and vomiting? I take it that what is really required is to give such indications as may be useful in showing you when the state of the patient is one which requires operation, and to point out the symptoms which cannot be neglected without any consideration for the patient's welfare. These I will give briefly.

In the first place, look with attention at the patient's face, for you may learn much from it. The colour, in a case of acute abdominal disease, will vary very much from that of a healthy person to the dusky flush of one whose respiration is embarrassed; the expression, from a placid indifference to that of a man in mortal agony. Sunken eyes with dark circles round them, a pinched face, and an anxious expression, are very ominous; if the nostrils are working rapidly you may be sure that the heart is also going too fast, and there is very serious disease present.

The pulse-rate is a very important indication as to whether

the case may be safely left, it is advisable to operate, or the patient is too far gone for relief. If some hours have elapsed since the commencement of the attack, and the pulse-rate is much too high, there is nothing to be gained by postponing an operation; every hour lost renders a successful operation less probable. Any abdominal case with a pulse-rate of over 100 should be carefully watched; if it continues to rise beyond this the patient will probably require surgical aid, although other symptoms may be improving. The temperament must be considered in estimating the value of the pulse-rate, for occasionally a patient may be unusually excited by the medical man's visit or be suffering from a neurosis.

The temperature is often misleading; there may be the most widely-diffused septic suppuration, with a normal or subnormal temperature. Usually there is a rise at first, but it should begin to fall on the second day. A low or subnormal temperature with a rapid pulse is a very bad combination.

Vomiting should cease after the onset; its continuance is a bad sign. The effortless pumping up of large quantities of greenish fluid should cause much concern.

Restlessness is an unfavourable symptom; so, indeed, is a condition of manifest indifference and apathy. Usually you will find your patient lying on the back, with the arms thrown above the head, and the lower limbs flexed on the abdomen. This attitude is not, however, universal.

Look for the marks produced by recent applications for relief of pain. These will give you some idea of its severity. Examine the skin for signs of inflammation and œdema, and when the abdomen is fully exposed note the amount of movement on respiration as naturally performed, and then ascertain how much the patient can voluntarily increase this. Find out the exact seat and character of the pain by asking the usual questions; also the history of previous attacks of a similar kind. Gently palpate so as to learn the condition of the muscles as regards rigidity, general or local; also the presence of any local swelling or undue resistance. Percuss the abdomen throughout, but with a light hand, paying great attention to the flanks and to the parts above the pubes. If there is any dull area try if it is affected by moving the patient, as the presence of free fluid is a sign of

importance. Define the liver dulness. Observe also the extent of distension of the intestines, the presence, or otherwise, of peristalsis, and whether this is local or general. If there appears to be some distension of the bowel find out if this is increasing in amount.

It is hardly necessary to remind you of the necessity of learning, from the friends, the state of the bowels, if there has been inaction or diarrhœa. But you should in nearly all cases make a rectal examination at once, and in most this has to be repeated. You thus ascertain from the beginning if the contents of the pelvis are normal or not. In some instances you will find inflammatory swelling on the right side, and in others an abnormal amount of tenderness. The extent of these will, of course, vary much with the nature of the case and the duration of the illness.

The number of cases of acute abdominal disease, which are secondary to disease of the appendix, naturally makes us, in the first instance, consider the subject from the point of view of that part of the digestive tract. The relative proportion of the various factors in the causation of acute abdominal diseases is shown in the statistics of the cases under care in St. Thomas's Hospital during the three years 1900, 1901, and 1902. In all, there were 456 cases, of which 168, or 37 per cent., caused by inflammation of the appendix, formed by far the largest class.

ACUTE ABDOMINAL CASES

Appendicitis and its complications	37 per cent.
Intestinal obstruction (other than intussusception)	24 ,,
Intussusceptions	16 ,,
Perforations of the alimentary tract	11 ,,
Pelvic or gynæcological cases	6 ,,
Abdominal abscesses (other than appendicitis)	3 ,,
The remainder	3 ,,

The great importance of the *rôle* which the appendix plays is clearly shown by this table. The first four of the groups in the list are the most important, and require special attention. They are worth consideration, in the first place, from the question of age, for, given certain difficulties in diagnosis, the probabilities will be in favour of intussusception during the first ten years of life, acute disease of the appendix between the ages of 15 and 30, perforations of the alimentary tract from 15 to 40, and intestinal

obstruction from the age of 30 upwards, with increasing frequency to a maximum between 50 and 60.

The simple and uncomplicated cases of inflammation of the appendix, and the attacks which end in localised abscess (a far more common occurrence than is generally taught), I shall not consider here. My remarks are chiefly concerned with cases in which the inflammation of the surrou ng peritoneum is not only a septic one, but tends to diffusion, and ends fatally if unrecognised or wrongly treated. I desire to illustrate by the description of cases the course of events in this type. When the illness is ushered in with a rigor, severe vomiting, very acute pain, or other startling symptoms, the friends, as well as the medical attendant, are alarmed and on the alert; but when the onset is rather indefinite, and the patient does not appear very much worse from one hour to the other, there is a danger that surgical assistance may be asked for when it is too late to do any good. I have unfortunately seen this often in cases of gangrene and perforation of the appendix, in which the extent and nature of the mischief had been quite unsuspected by the relatives.

The case of a boy, aged six and a half years, is a very good example of the type of which I am speaking. He was admitted to the Leopold Ward (house surgeon, Mr. J. C. D. Vaughan; dresser, Mr. S. Churchill) March 30th, 1905, and left on May 20th. He first began to be unwell on March 27th, about midday, and was sick on the 28th and 29th. He had some abdominal pain and constipation, but not very much pain. He was thought to have some stomach derangement and was given castor oil. Mr. E. T. Whitehead, who saw him on the morning of admission, thought seriously of his state, and I agreed with him, when we saw the boy together about twelve o'clock, that he had diffuse peritonitis secondary to disease of the appendix. The state of the boy at that time was as follows: He was a pale lad, with light hair, lying in his bed partly turned to the right, and apparently quite comfortable. He did not look very ill, smiled when spoken to, and answered questions about his age, etc., quite readily. He drew a deep breath when requested to do so, and said that his chest did not hurt him; he admitted that he had had some pain in the stomach. When requested to turn round in his bed fully he did so easily and with a smile. The

abdomen was somewhat distended, not rigid, but with greater resistance in the right iliac fossa than in other parts. In the right flank, running obliquely into the pelvis across the iliac fossa, was a well-marked area of dulness, evidently, from its shifting character, due to fluid. His tongue was moist and clean; he had vomited the night before, but not that morning. The bowels were confined. He had slept without morphine. The temperature was 99° F., but his pulse was 140. At the operation at 3 p.m. we found very offensive pus in the right flank and pelvis, quite unlimited by adhesions, and lymph [illegible] the coils of intestine, in the iliac fossa, and pelvis. The appendix was large, its walls were œdematous, there was a [illegible]ular band of gangrene running round it about three-quarters of an inch from its distal end, and in the mesenteric border of this part there was a perforation. On opening the appendix there was a concretion above and another below the gangrenous part. The subsequent history was briefly as follows: The bowels acted on the 31st after a turpentine enema, and improvement followed in the condition of the abdomen, but he suffered from vomiting. Until April 2nd he was very ill, losing flesh and strength, with occasional vomiting of coffee-ground material. His pulse had come down to 100 and his temperature was 98°, but he seemed to have "no rally." On the 3rd this brown, offensive vomiting ceased at 8 a.m. Later in the day five grains of calomel were given with good result, and he began to improve. Making steady progress from this time, his condition no longer continued to be a source of anxiety to us.

This case has been given because the symptoms were not those typical of the acute abdomen; the onset was insidious, and I think it is a very important and excessively dangerous type. Operation was only just in time, and I feel confident that if it had not been for the skill and devoted attention of the sister of the ward he would have slipped through our hands, for his state was very serious for some days afterwards. In these cases a slow absorption of toxin takes place by the lymphatics of the peritoneum, and it may be only when renewed vomiting is added to the rapid pulse that the gravity of the case is appreciated. How often do we hear it said, "But I never suspected it; he had so little pain, and seemed so well."

A typical example of acute abdominal disease secondary to appendix mischief is the following: A schoolboy, aged 11 years, was admitted to St. Thomas's Hospital, under the care of Dr. Hector Mackenzie (house physician, Mr. A. Bennett; house surgeon, Mr. A. C. Birt; dresser, Mr. G. M. Custance). His illness began four days before (January 21st) during the night, with acute pain in the right side of the abdomen; on the following day he was much worse. He also felt sick, and vomited everything he took. His bowels were constipated, and remained so until admission. The vomiting and pain in the abdomen continued. On admission he had a pinched, anxious-looking face, and complained of pain in the abdomen, chiefly in the lower part on the right side. He was lying on his back, with his legs drawn up. The abdomen did not move at all in the lower part, and there was only a slight movement in the epigastrium and upper part. On palpation, great tenderness was found all over the lower part, especially in the right iliac fossa. The abdominal muscles were rigid, and a swelling was detected in the right iliac fossa, extending upwards from Poupart's ligament. This swelling could not be defined accurately owing to the muscular rigidity. On percussion, dulness was present over this swelling, and also in the left flank. The rest of the abdomen was resonant. The pulse was 100, the respirations were 20, and the temperature was 100·6° F. This patient was restless, and protested vigorously against operation. When the abdomen was opened pus in considerable quantities was found free in the peritoneum. There was much deposit of lymph on the peritoneum covering the small gut, which was generally reddened; in some places hæmorrhagic patches could be seen under this lymph. The purulent fluid filled the pelvis and extended into the right flank. The appendix was 3 inches long, thick and fleshy, with gangrenous mucosa. There was a concretion in the central part, and just below it a minute perforation, plastered externally with fibrinous lymph. The peritoneal cavity was washed out with warm saline solution; some of the lymph was gently removed with gauze sponges; a drainage-tube was inserted, and also a gauze strip. After the operation the patient's sickness ceased; his pulse gradually fell to normal, but was still 108 on February 8th, fourteen days after operation. At first he was

peevish and difficult to please, but left the hospital quite well on March 17th.

You will perhaps be called upon to give your opinion in a case in which, for a time, there has been a very evident improvement and the friends of the patient naturally think the dangerous stage is passed and recovery assured. "He is so much better!" Here you must be guided by various considerations. We may take as an example the case of a stout strong man, aged 35, who had suddenly improved about 12 hours after the commencement of symptoms. Dr. Yeld asked me to see him because he was not satisfied with the general condition. We found him (24 hours) without pain, but with a pulse of 120. He protested very strongly against operation, and struck his abdomen violently with his closed fist to show how well he was and how free from pain. After much persuasion we convinced him of the need for operation, and found a perforated appendix with commencing suppurative peritonitis (spreading). The following also affords an instructive example of this type: On October 2nd, 1905, the patient, previously a healthy girl, aged 19 years, was slightly troubled with diarrhœa, the cause of which was not known. On the morning of the 3rd she was awakened the first thing by severe pain in the lower abdomen. She vomited throughout the day, being unable to retain any nourishment. The bowels did not act; she was kept in bed. On the 4th there was a severe attack of vomiting and diarrhœa at 8 a.m., and the pain persisted. When she was first seen the abdominal movements were very slight. There was general tenderness, especially in the epigastric and right iliac regions, but the abdomen was not very rigid. The tongue was coated and rather dry. The pulse was 136 and the temperature 100° F. At 9 a.m. on the 5th the tenderness was rather more marked in the right iliac region than elsewhere. The abdomen was more distended and harder to the touch. Per rectum, the chief tenderness was to the right; there was no tumour. Vomiting had ceased at 3 a.m. The pulse was 120 and the temperature was 99·6°. About 12.30 p.m. when seen with Mr. Roalfe-Cox, she was rather flushed and looked rather tired, but was quite cheerful and clear headed. The tongue was furred; it had been dry. No morphine had been given. The abdomen was slightly distended,

generally tender, not moving well, and the patient was unable to draw a deep breath. There was tenderness, especially in the right iliac fossa; the right rectus muscle in its lower part was somewhat fixed. On percussion there was dulness in the right flank, and more resistance than elsewhere, but no definite swelling. Otherwise the abdomen was normal. The pulse was 140.

An operation was performed as soon as possible. Free purulent fluid was found on opening the peritoneal cavity and thick pus filled the pelvis; this was very offensive. The appendix was lying upwards and to the left, and was adherent to the peritoneum of the umbilical region. It measured about 3½ inches in length, was fleshy and contained a large concretion; below this was a patch of gangrene, and in the mesenteric border of this patch was a perforation. The pelvis was carefully cleaned with dry aseptic gauze. Some pus was removed from both flanks. The coils of intestine in the pelvis were covered with thick lymph which adhered closely, and it was only sponged away where it was lightly adherent. A gauze plug was inserted and the pelvis was drained. On the 8th the patient was doing extremely well. The pulse was 60. There was no pain. The temperature was normal. The bowels acted after calomel. The abdomen moved satisfactorily, and was no longer tender. The plug was removed and the glass tube replaced by a rubber one. She made a good recovery.

The reason that the medical attendant was not consulted at the commencement of the illness was that the patient always suffered much at the commencement of the period, and as this was due on October 3rd her pain was put down to that. The period came on at the proper time, but without relief of the pain. It was then recognised that the period was not responsible, and that the patient had some serious illness.

Here it was the rising pulse on the fourth day of illness more than anything else that induced us to urge operation on the relatives. Had there been a definite swelling in the iliac fossa or pelvis, perhaps one would have felt less certain of the need for immediate operation, for it would have been probable that some attempt at localisation was taking place. All the other symptoms were quite satisfactory.

In yet another case, also seen in consultation away from the hospital, after a definite attack of severe pain, the patient was apparently quite recovered from the peritonism and felt perfectly well. Here the verdict in favour of operation was given because of the excessive rigidity of the lower part of the right rectus which a dose of morphine had not in any way diminished. The patient, a man, aged 32 years, was seen with Dr. G. D. Davidson about ten o'clock in the morning of March 15th, 1905. He had complained of some stomach-ache on the previous evening and vomited after a dose of castor oil. He then sent for Dr. Davidson who, knowing that he had had a mild attack of appendicitis two years previously, examined him very carefully. The man had a normal temperature and natural pulse-beat, and the only thing unusual was tenderness above Poupart's ligament on the right side. The pain was not very severe, so no medicine was given to make him sleep, but he went to bed earlier than usual and slept until 4 a.m. on the 15th, when he was awakened by a severe pain in the abdomen. He again sent for Dr. Davidson who found him suffering severely and gave morphine to relieve the pain. The pulse was then 70 and the temperature was normal. At ten o'clock, when we met, the patient had been sleeping and the pain was completely gone. His expression was good. The pulse was 80, the respirations were 20, and the temperature was 98·6° F. The tongue was thickly coated but moist; the bowels were confined. The abdomen was rather rigid generally but not distended. Tenderness was complained of on pressure in the right iliac region, but the lower part of the right rectus was so very hard and rigid that nothing could be felt in the iliac fossa. The percussion note in this region was impaired, but it was difficult to define any dull area.

Immediate operation was advised and performed. There were some ounces of pus diffused in the iliac fossa and pelvis, with peritonitis affecting the coils of small intestine in the area exposed, some of which were covered with lymph. The appendix was large, measuring 5½ inches in length and about 1½ inches in its greatest transverse diameter. It was much distended and discoloured, being gangrenous in places. There was a stricture of the proximal end and beyond that was the distended portion; the gangrenous wall had given way in places—one of these openings was partially

blocked by a stercorolith. Three other stercoroliths were present and the whole of the mucous lining was gangrenous. The appendix was difficult to bring to the surface and could not be lifted until its attachments had been divided. The peritoneum was very sensitive; during the operation pulling on a coil of small intestine or sponging the peritoneum caused at once a change in respiration, and it may be that this unusual degree of sensitiveness was accountable for the paralysis of a part of the small intestine near, which subsequently developed, causing subacute obstruction. All inflammatory symptoms ceased after the operation; the temperature remained normal, whilst the abdomen was without distension or pain, and the bowels acted, but nothir appeared to relieve the patient of his sickness.

A second abdominal incision a week later showed the complete absence of peritonitis, but disclosed a portion of small intestine about 12 inches in length near the right iliac fossa, which was flaccid, and above which the gut was distended. This was emptied through a puncture which was then closed, but the patient did not survive may hours.

In this instance, then, the patient suffered from the local effects of the acute mischief and not from the general results of the absorption of toxins. Dr. Davidson deserved success, for no one could have been more prompt in the recognition of the severity of the case or have treated it with more skill than he showed.

We are told by some surgeons that the removal of the appendix should be carried out immediately in all cases when signs of an attack of appendicitis are recognised. This may be called the counsel of perfection. The public, which has become somewhat familiar with the disease in its milder aspects during the past few years, can tell you of so many friends who have recovered without operation that the suggestion is often scouted as soon as made. You cannot with a good conscience say that the attack will not in all probability pass over without risk of life in the majority of those treated without operation. What I do think is that your duty as a medical adviser renders it imperative that you should be so skilled in the recognition of the various aspects of the disease that you should be able to say definitely when immediate operation is "imperative," not only when it is "advisable." There are quite sufficient proofs in the hands of

the profession that such excellence can be obtained. My advice to you is to endeavour to attain it.

There is another thing that should be remembered, and that is not only the need for operation in these serious cases, but for early operation. A few hours may make all the difference between a life saved and a life lost. Do not behave with over-anxious fussiness that shows your alarm to the friends, if you conceal it from the patient himself, but see that sufficiently frequent visits enable you to observe the earliest signs of any unfavourable change. There are undoubted recoveries on record from a general acute septic peritonitis, but they are not so numerous as published cases would have us believe. There is a difference between "diffused" and "general" which is, I am afraid, not always appreciated by those who write and talk about these cases.

The occurrence of an acute suppurative peritonitis in a pregnant woman is a very serious complication and frequently proves fatal. This subject cannot be adequately discussed here. (I would refer you to a larger publication on diseases of the appendix.[1]) As a rule the only chance for the patient is immediate operation, or operation within 24 to 36 hours of the onset. I have not mentioned cases of peritonitis which presented no prospect of recovery from the time of admission (the too late type); they would not do more than emphasise what I have endeavoured to impress upon you—the importance of the *early* recognition of symptoms, and promptitude in acting upon them in the conditions on which the "acute abdomen" when due to a diseased appendix depends. There are other cases in which the immediate symptoms are extremely urgent, and these are the examples of sudden rupture of an empyema of the appendix into the general peritoneal cavity. The following case under the care of Dr. T. D. Acland is an interesting one in this regard.

The patient, F. B., a boy, aged 11, was admitted to St. Thomas's Hospital under the care of Dr. Acland (house physician, Dr. Perry), on September 29th, 1909. It was stated that the patient awoke at one o'clock on the day of admission, complaining of severe general abdominal pain, worse in the right iliac fossa. There

[1] Battle & Corner.

was no vomiting; the bowels had been constipated for 36 hours previously. It was reported that the boy, who was said to have been always delicate, had been quite well on the previous day, and had eaten several apples. Although delicate he had had no previous illnesses, with the exception of an attack of abdominal pain four weeks prior to admission, which was unattended by sickness and localised itself in the right lower abdomen. On admission he was a thin anæmic boy, with a six hours' history of abdominal pain. His pulse was 120, regular, of good volume and tension. His respiration 20 per minute, not laboured; temperature 101°. The abdomen was poorly covered, and did not move very much on respiration. On percussion the liver dulness was normal; dulness was present in the right flank, which disappeared with change of position. Tenderness on palpation was general, but most marked in the right iliac fossa. At 10.30 a.m. when I saw him the pulse rate was 132, volume and tension not so good; temperature 102°, abdominal pain more acute. There was also more dulness in the right side of the abdomen with some over the pubes, the amount of free fluid having increased in quantity. At this time the boy was pale, looked anxious and pinched. Operation was performed 10 hours after the commencement of symptoms. An incision was made in the right side of the abdomen through the rectus muscle, the fibres of the muscle being separated with the handle of a scalpel. When the peritoneal cavity was opened much pus was found in the right iliac fossa and also in the pelvis. It was thick, yellow, and without offensive odour. A gauze strip was placed in the pelvis and another in the left flank through the abdominal wound, so as to absorb pus whilst the appendix was removed. Three rows of sutures were applied over the cæcal opening. The peritoneum in the region affected was dried by means of gauze strips, and the wound closed, with a rubber drainage tube passed through the lower angle into the pelvis. The greater quantity of pus was found in the right flank above the position of the appendix. Anti-bacillus coli serum (25 c.c.) was injected subcutaneously into the chest wall before the patient left the theatre. He was placed in a sitting position, and continuous instillation of warm saline fluid into the rectum commenced. The tube was taken out on the third morning and shortened by

1 inch. A good deal of thick, rather offensive pus welled up. On the night before the temperature was 100·2°, next morning 99·2°; bowels well opened through the use of sulphate of magnesia, one teaspoonful having been given hourly until they acted. The child was very well and enjoyed looking at some illustrated papers. He had lost all pain. On the 8th there was still a fair amount of discharge, and a small tube was still kept in, but the temperature was normal, pulse 86, and he had no pain. He continued to progress satisfactorily, and left the hospital October 31st.

The appendix was unusually large, and presented a perforation towards the tip. When opened a stricture was found about the junction of the proximal two-thirds with the distal third, which completely closed the lumen of the tube at that point, forming in this way a cavity of the distal third, with which the perforation communicated, and from which pus was exuding when the appendix was found. The patient had had an empyema of the appendix which had ruptured suddenly into the general peritoneal cavity and so caused the symptoms of unusual urgency which have been described. The diagnosis of the exact condition depended upon the extreme suddenness of the onset, the severity of the symptoms and the large amount of fluid which was noted before the operation, although such a short time had elapsed since the commencement of the trouble. The history of a former attack of pain, as pointing to pre-existing disease of the appendix, was regarded as important.

In the consideration of the acute abdomen and its relationship to disease of the appendix there is another way in which a most serious condition may arise, and that is through the bursting of an appendix abcess into the peritoneal cavity. This is a most formidable complication to control and until a few months ago it was in the experience of most, invariably a fatal one. As you are aware, in cases of appendix suppuration there is an attempt made by nature to localise the pus; occasionally for some reason this is only successful for a time, and there is a further spread of the pus and involvment of more of the peritoneum. This appears to take place slowly and is not accompanied by the definite signs which we have spoken of as peritonism. A very different clinical picture is presented by the patient in whom

an abscess containing a large amount of pus has suddenly burst, distributing its septic contents throughout the abdomen.

Examples of this complication of appendix abscess have been under treatment during the past few months; they are very instructive, and the result gives hope for the future. Several such cases have been under my care since July, 1904.

A patient, aged 19, a ward maid at a fever hospital, was admitted into St. Thomas's Hospital under the care of Dr. Hector Mackenzie on November 3rd, 1904. Her illness commenced with pain in the right iliac region seven days before admission. She was obliged to go to bed, but resumed work on the following day and did her usual duties as well as she could until about 15 hours before she came into hospital, when a sudden acute pain attacked her and she was again obliged to go to bed. There had been diarrhœa for two or three days. When I saw her with Dr. Mackenzie she was propped up in bed, her nostrils were working rapidly, and she was breathing with some difficulty. Her face was dusky and anxious-looking, she was restless, but quite clear in her mind, and able to answer questions. Respiration was 32, pulse 100, and temperature 100·6°. The lower abdomen was distended and did not move at all on respiration; the upper half moved moderately. On palpation there was a marked resistance in the lower half of the abdomen, especially over the right iliac fossa, where there was a definite swelling. There was great tenderness here; the abdomen was generally tender. On percussion extensive dulness was found in both flanks, but not in the middle line. The liver dulness was obliterated. The respiration was thoracic and shallow, the tongue furred and dirty. At the operation an abscess was found to have given way on its pelvic aspect, and the pelvis was filled with offensive, semi-purulent fluid, which was generally diffused throughout the lower part of the abdominal cavity. Lavage with warm saline solution was carried out, and drainage through the openings made in the abdominal wall. The patient made a good recovery, and later on the appendix was removed.

Another case which presented similar symptoms, and also ended in recovery, was that of a man aged 33 years, who was sent to the hospital by Mr. Hallam, and was admitted under the care of Dr. Mackenzie on the day following the admission of the

patient whose case I have just recorded. The patient had had an attack of pain in the abdomen on October 31st, chiefly on the right side, but did not give up his work. During the night of November 3rd an attack of intense pain was experienced, and he came to the hospital in the morning, sixteen hours later. When examined he was found to be perspiring freely, his face was pale and anxious-looking, respirations were shallow and diaphragmatic. An attempt to breathe deeply caused him much pain in the abdomen. The pulse was 104, temperature 101·2° F. There was no vomiting, the bowels were confined, the abdomen did not move on respiration and was very tender on examination, especially in the right iliac region and in the loins. There was dulness in the flanks and the liver dulness was obscured. The abdominal muscles were rigid, his rigidity being most marked on the right side. In the right iliac fossa there was an ill-defined swelling. At the operation two incisions were made, one through the right rectus muscle and the other through the middle line below the umbilicus. Offensive, semi-purulent fluid was generally diffused throughout the peritoneum; the intestines looked very congested and œdematous; the abscess had ruptured to its outer side. Lavage with saline fluid of a temperature of 110° was thoroughly performed, the hepatic and splenic regions being carefully irrigated. Drainage was employed from both wounds. These were closed by December 17th, and later on the appendix was removed. In this case, as in the former, suppuration had followed perforation of the appendix beyond a stricture. It will be noted that in both these cases there was a definite fixed swelling in the iliac fossa, in addition to the free fluid.

Indefinite or subacute appendix symptoms coming on in patients of advanced years should excite the apprehension of any one under whose charge the patients may be. The signs of disease may be few, whilst the age and weakness of the patient make it inadvisable to do any operation excepting one of absolute necessity. Yet the most serious disease of the appendix may be present, and a fatal result inevitable, unless it is removed. Vague abdominal pains, with some rise of temperature and perhaps a little sickness, may be the only complaint; perhaps even the medical man is not sent for until there is superadded a flatulent distension of the abdomen and a running pulse. The

following account is accurate of a type of which I have seen more than one fatal example. On September 10th, 1909, I saw a man, aged 73, with Mr. Roalfe-Cox. During the night of Tuesday, the 7th, he was awakened by pain in the abdomen, but did not vomit. The pain was not severe, but he took some castor oil. Next day, the 8th, he sent for Mr. Roalfe-Cox, who found him with a temperature of 100° and symptoms of a mild attack of appendicitis. On the 9th he was much the same, but his temperature was slightly raised; he had vomited on the previous evening, and his tongue was becoming dry. Nothing abnormal could be felt per rectum. His condition at 2.30 on the 10th, when we saw him together, was as follows: He was a healthy-looking man, with a normal temperature, good appetite, and a pulse of 88; his chief complaint was want of food and the fact that they kept him in bed. The only symptoms of anything wrong were a very dry tongue and some sharp, indefinite, superficial tenderness about the abdomen on the left side. The walls of the abdomen moved well, there was no rigidity, no tumour, and no abnormal dulness. He had no sickness, and his bowels had acted well the day before. Operation was not advised, but later vomiting came on, he became much worse, and died after an operation on the 12th, at which I was not present. The appendix was gangrenous, and two concretions were found outside in the pus which had formed in the peritoneal cavity.

It will be noted that there was no swelling in the iliac fossa, whilst a sharp general superficial tenderness could be elicited, although he had no pain.

II

THE TREATMENT OF ACUTE APPENDICITIS WITH PERITONITIS

The treatment of appendicitis, with infection of the surrounding peritoneum, whether this be still localised or more generally diffused, must be carried out on definite principles, so that no time is lost before the source of the evil is removed.

Most surgeons still prefer the use of a general anæsthetic; my own practice is to give gas, followed by ether in early cases, where there is no evidence of respiratory complications, leaving it to the anæsthetist to substitute chloroform if he thinks fit during the progress of the operation. The open method of administering ether has proved very satisfactory, even in quite young children.

In America the practice of giving gas and oxygen is in much favour, whilst in the Children's Hospital, Great Ormond Street intraspinal injection has been tried and approved.

The incision to be employed for opening the abdomen will vary somewhat with the nature of the case; occasionally, when the diagnosis is uncertain and where pelvic disease cannot be excluded, a median section may be necessary.

In most instances, in thin adults and children, an incision through the sheath of the right rectus, and a separation of the muscular fibres of the latter, is the best; in stout patients, with thick fat abdominal walls, especially if rapid operation is called for (and it usually is), or if the surgeon is short-handed, the incision is better made through the linea semilunaris. I think that this incision is more likely to lead to a subsequent hernial protrusion, but this consideration must not be allowed to weigh against the satisfactory performance of the operation; time is such an important element in these cases that a quick operator, who knows exactly what to do and what not to do, will obtain a

higher percentage of successes than a man who begins by making an inadequate incision through which he cannot manipulate and examine the parts without pulling and pushing with some degree of force, and considerably bruising the wound. All handling of abdominal organs should be quiet but firm, and inflamed gut in the region of the appendix should be dealt with very gently.

Let the incision be made from the first sufficiently large to admit the operator's hand; an opening smaller than this has so often to be enlarged, on account of the difficult position of the appendix, or its firm adhesion to parts around.

Mr. C. P. Childe has written a most interesting paper[1] on the question of the position of the incision in operations for acute conditions of the abdomen, and it is well worth perusal by all surgeons. In this he points out that nearly all the diseases for which the surgeon is required to operate, which cause the acute abdomen, have their origin between two imaginary lines, the one on the left drawn from the seventh cartilage, an inch to the left of the sternum, to Poupart's ligament; the one on the right drawn from the anterior superior spine perpendicularly upwards to the lower border of the thorax. The incision which he recommends in cases where the abdominal condition is obscure is one which is placed midway between these lines. This would, however, come directly over the rectus muscle, the outer margin of which (the linea semilunaris) is found at the junction of the inner three-fifths with the outer two-fifths of a line from the anterior superior spine to the umbilicus. The incision through the rectus is not a bad one in acute abdominal cases, and I have no doubt of its advantages in many cases; but there must be a clear understanding of the line which will lead to its margin, if the operator wishes to take that. The conditions which most frequently produce the acute abdomen vary somewhat at different ages; but taking an average of a large number of patients, a diagram may be shown which expresses fairly well these positions and the frequency of their occurrence by means of shading (see Fig. 1).

In Fitz's table of acute intestinal obstructions no less than 67 per cent. had their origin in the right iliac fossa.

When the peritoneum is opened, pus, usually of an offensive

[1] The Area of "Acute Abdominal Conflux" and the 'Incision of Incidence," *Lancet*, 1907, Vol. I., pp. 936.

odour, will at once escape in varying amount, but it is not necessary to wait until this flow has ceased before proceeding with the operation. Let the end of a strip of sterilised gauze, 4 inches wide, be put down into the pelvis and the bowel pushed aside with other strips of similar material, arranged so that they shall protect the edges of the wound. One of these plugs should be passed into the right loin to the outer side of the cæcum. Search should then be made for the appendix, which must be removed. When found it is wrapped in gauze, to prevent the diffusion of more septic material. As a rule, if more than 36 hours have elapsed since the beginning of the attack, it is necessary to remove the appendix by the "coat sleeve" method, and it is well to bury the stump securely in the cæcum with more than one row of sutures.

After removal of the appendix, the plugs, which are now saturated, should be taken away, and the infected parts cleansed with gauze. This should not be done with any roughness, for the injury to the peritoneum, resulting from too vigorous handling, may cause the subsequent formation of adhesions. No harm results from gentle lavage of the region involved with warm saline solution, but the fluid should not be used too freely, as there is undoubtedly a danger of disturbing defensive exudation and of disseminating septic material into areas as yet uninfected. In the case of females the pelvic organs should be examined at this stage.

Having seen, in the earlier days of the operative treatment of these cases, the evils which may follow from the lack of provision for drainage, I have no hesitation in recommending it, in all instances where any free pus has been found in the peritoneal cavity. It is true that in exceptional cases satisfactory results may be obtained after the wound has been closed without drainage, but the average of success will be higher if it is provided for. It has been my custom to place two rubber tubes in the wound, one extending into the pelvis and the other into the right loin, and to bring them out at the lower end of the incision. The practice of introducing multiple tubes through separate openings is unnecessary. There is much to be said, however, for the insertion of the loin tube through a separate opening above the right iliac crest in cases where extensive infection on

the outer side of the ascending colon has been found. An opening of the size required will not be followed by a hernia, and the duration of the after treatment is possibly shortened. In the earlier stage of peritonitis, due to disease of the appendix, it is advisable to close the abdominal wound in layers, leaving room merely for the passage of the drainage tubes, but in the late stages, when the condition is serious, it may be advisable to only put in a few strong interrupted fishgut sutures, penetrating all the layers of the abdominal wall. In still more rare instances, when the state of the patient is very bad, the best course may be to leave the wound unsutured, packed with sterilised gauze, and secured with a firm bandage. The accurate closure of the wound can be undertaken after the patient has rallied from his collapse.

The tubes should be removed in two or three days, but if the discharge at this period is still profuse, or the temperature high, they must remain in place for a longer period.

I have described the routine treatment which is required in an average straightforward instance. If this plan is carried out with reasonable despatch, recovery may confidently be expected in the majority of cases which are subjected to operation. It must not, however, be thought that all cases of spreading peritonitis are cast in one mould, and that the surgeon's task is an easy one in every example of 12 to 72 hours' duration. They differ one from the other very considerably, and each requires to be studied most carefully by itself. In one instance the amount of systemic disturbance is so slight that the patient lies comfortably in bed, without premonition of his danger; in another of similar or even shorter duration the vital depression is so severe that operation is only possible after intravenous infusion of sterilised saline has been given. This it may sometimes be necessary to continue during the performance of the operation, for rectal or subcutaneous infusions in such cases are too slow in their action to be of value. Liquor strychninæ and caffein may be useful, though their action is but transient.

When the depression is part of the primary peritonism, some recovery from it may be expected after a wait of a few hours; but if the collapse is secondary to a general toxæmia, marking the onset of the final stage, it is wrong to wait. Every moment

increases the amount of poison absorbed, and diminishes the chances of recovery. Occasionally it may be possible only to make an incision into the peritoneum, to give exit to the pus, and so endeavour to localise the spread of the purulent effusion, a drainage tube being inserted to drain off the remainder of the fluid gradually. Combined with the free rectal exhibition of saline, this may be successful without immediate removal of the appendix; but without proctoclysis, the incision and drainage

FIG. 3.—Ord's apparatus for keeping patient up in bed.

alone is not likely to succeed at the present time any more than it did twenty-five years ago in similar cases.

So much for the operative considerations in this condition. It must not, however, be forgotten that the ultimate course of the case is greatly influenced by the details of the after treatment.

It is now customary to place the patient in bed in a sitting attitude—"the Fowler position." The object of this is to encourage the gravitation of fluids towards the pelvis, thus limiting the infection to a part where the local resistance is high and drainage feasible. The maintenance of the position may be facilitated by the fixation of a padded block or stretcher across the bed, just below the level of the buttocks. It is kept in place by straps passing to the head of the bed on each side. In any case in which the patient's condition is not good at the completion of the operation, a pint of warm saline, containing an ounce

of brandy, should be administered by the rectum before he leaves the table. As a routine, after the patient is arranged in bed, the continuous instillation of saline is commenced. A perforated pewter tube is introduced into the rectum, the end of this is attached by means of rubber tubing to a reservoir containing the fluid, kept at a temperature of 105° F. The flow

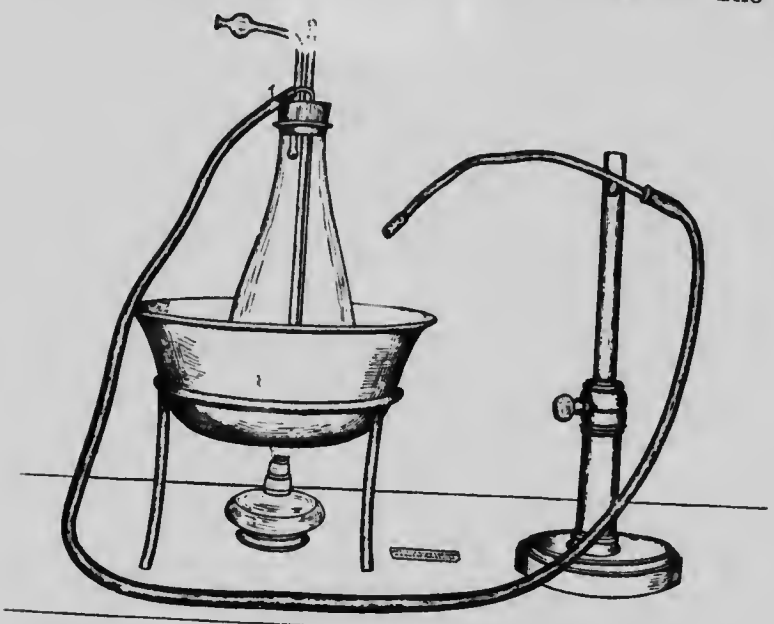


FIG. 4.—Apparatus used for the continuous administration of fluids per rectum.

is controlled by a screw-clamp on the tube. The vessel should be about 1 foot above the level of the rectum.

Sometimes the saline is not retained. This may be due to a too rapid inflow of the fluid, or to its being at the wrong temperature. In other cases the lower bowel must be cleared out with a simple enema before toleration to the inflow is established. If this method proves impracticable, subcutaneous infusion must be employed, and may be repeated. At times the continued flow of saline into the subcutaneous tissue may be useful, but a watch must be kept on this method, otherwise the tissues become quite "water-logged."

It is not usually advisable to give anything by the mouth in the first six hours after operation; the absorption of saline into the circulation relieves the sensation of thirst and increases the dilution and rapidity of excretion of toxic products. On this account there is no doubt that the steady introduction of fluid into the system by one means or another is of great value after operation in cases of peritonitis.

At this stage the question of giving an "anti-toxic serum" arises; the infective process in most cases of appendicitis is due to the bacillus coli; and an "anti"-serum to this organism has been prepared. I have employed it in a number of cases, but cannot say that it appears to very materially alter the course of the disease when comparison is made with instances not so treated. The serum should be injected into a pectoral or gluteal muscle; a dose of 20 c.c. is given immediately after the operation, and this may be repeated at intervals of 24 hours for two or three days. Joint pains and fleeting rashes not infrequently follow this administration. It is probably given too late in most cases.

For the relief of the pain and discomfort still present after the operation an injection of morphine may be given, if a good night's rest is not otherwise to be obtained; but on account of its paralysing action on the bowel the dose should not be repeated.

After every operation some vomiting is to be expected, and for the first 24 to 36 hours no definite treatment is called for to combat it; if, however, it continues longer, becomes more frequent or offensive, an attempt to check it must be made. The slighter cases may be stopped by the administration of $\frac{1}{32}$-gr. doses of cocaine in an ounce of water at intervals of an hour; sometimes minim doses of tincture of iodine are successful. If these measures fail, and the patient is much distressed, the stomach should be washed out with dilute sodium carbonate solution; this will at any rate give rest for some hours and probably allow of the proper administration of a purgative, which will materially benefit the condition.

In the more persistent cases the prognosis becomes very grave, as either a general toxæmia or secondary intestinal obstruction is present.

An attempt to obtain an action of the bowels should be made on the second day following the operation. I usually give a 3 to 5-gr.

dose of calomel, followed after four hours by ʒi doses of magnesium sulphate or other saline purgative at hour intervals till an effect is obtained; in obstinate cases I have found a $\frac{1}{10}$ gr. of elaterin very useful, the value of which was first demonstrated to me by Dr. John Harold. The diet for the first few days should be fluid in character; if no adverse symptoms are present by the third or fourth day, small amounts of chicken cream, and fish may be given, and at the end of a week the patient will be on practically a full diet, if it is fancied.

Meteorism, sometimes very intense, associated with a feeling of great abdominal discomfort, appears in many cases. Indicating as it does a paralysis of the muscular coats of the intestine, its persistence will always give cause for anxiety; a turpentine enema (ʒi—ʒij turpentine in ʒx of acacia emulsion) or the action of one of the above-mentioned purgatives may relieve the condition. If these fail, and the passage of a long rubber rectal tube proves equally ineffective, three or four subcutaneous injections of eserine salicylate ($\frac{1}{100}$ gr.) may be given, though in my experience it is of small value in those obstinate cases which are due to more or less complete intestinal stasis, when the necessity of a second operation must be considered. If the obstruction is caused by intense local peritonitis little can be done by such interference; in cases where it is due to mechanical kinking or strangulation of the bowel operation may afford relief.

The wound will require at least a daily change of sterile dry gauze for some time; if the discharge is copious and offensive, gauze soaked in 1 in 1000 lysol or 1 in 80 carbolic is to be preferred. Any local tension must at once be relieved by the removal of skin sutures. Cellulitis or sloughing of the abdominal wall may require more radical measures such as incisions and the frequent application of hot dressings, but if the wound has been well guarded during the operation the local infection will be slight, if any.

All degrees of fæcal fistula may develop in the wound, from the second or third day to the eighth; they may be due to a giving of the sutures in the cæcum at the point of removal of the appendix or to the sloughing of part of the bowel wall in a part of the intestine involved in the inflammation. They tend to spontaneous healing in practically all cases; the diet in these

circumstances should be readily digestible or such as to leave little debris; violent purging should be avoided, the dressings must be frequently changed and an outside pad of carbolised tow, wood-wool, or peat moss will confine the offensive odour and prove an economy.

The onset of black vomit is never a satisfactory symptom, for it indicates a very severe degree of toxæmia, and must cause considerable anxiety to those in charge. Other signs of toxæmia are present, frequently associated with constipation and distension of the abdomen. Washing out of the stomach with the administration of turpentine enemata may prove very useful. Should turpentine fail, the administration per rectum of a pint of molasses or common treacle will not infrequently cause an action of the bowels and a rapid general improvement.

A serious amount of cardiac weakness leading to rapid pulse, breathlessness, and dropsy of the legs, may develop during convalescence; it requires energetic treatment with cardiac stimulants, diet, etc., over a period which may be prolonged and demands much patience, even when the wound (usually in an adult) has done well.

III

PATHOLOGICAL PERFORATIONS OF THE DIGESTIVE TRACT

Perforation of Ulcer of the Stomach

In considering the perforations of ulcers of the digestive tract that give rise to the "acute abdomen," it is not proposed to include those which take place at the site of a malignant growth, but only those which are known as simple, the sudden giving way of ulcerations of the stomach or bowel into the general peritoneal cavity. It is not my intention to enter closely into the cause of these ulcerations; this is fully discussed elsewhere, and is beside the present question.

Fig. 5.—Acute perforation of a gastric ulcer, A. (St. Thomas's Hospital Museum.)

Gastric Ulcers.—In the autumn of 1894 Mr. A. Pearce Gould opened a discussion at the annual meeting of the British Medical Association at Bristol, on the surgical treatment of simple ulcer of the stomach, duodenum, and typhoid ulceration of the ileum and colon.[1] The influence of this debate in Great Britain did a great deal to encourage this branch of surgery and clearly defined the steps of the operation which are essential when any of these ulcers have perforated. There is no doubt the profession has been much indebted to Mr. Gould for the able manner in which he brought forward this subject, for it did much to encourage operative treatment as a matter of routine. At that time the introducer of the discussion only knew of seven cases of successful operation for the perforation of a gastric ulcer. At the present time

[1] *British Medical Journal* 1894, Vol. II., p. 862.

the diagnosis and main principles of treatment are so well understood that no surprise is expressed when recovery follows operation. Success is usual, and depends more on the individual patient and the time which has elapsed since the perforation took place than on anything else.

In the volume of the St. Thomas's Hospital Reports for 1904 will be found a paper by Mr. Percy Sargent on pathological perforation of the stomach and duodenum, founded on 124 cases which had been treated in St. Thomas's Hospital. The series

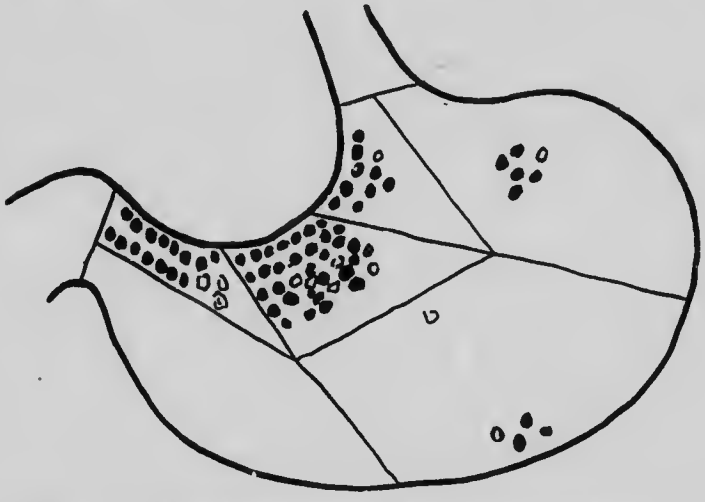


FIG. 6.—Stomach perforations. Most common position.

includes seven cases in which perforation complicated carcinomatous ulcer, 20 in which the peritonitis was localised to the neighbourhood of a chronic gastric ulcer, and two in which this limited inflammation complicated chronic duodenal ulcer. This leaves us with 74 perforations of gastric ulcer (four of them acute), and 21 perforations of duodenal ulcer (three of which were acute) in which there was more or less diffuse peritonitis. He reminds us that the first operation for perforation of a gastric ulcer in St. Thomas's Hospital was done in 1892. This was not successful, but in August, 1896, a success was obtained for the first time. Altogether 49 cases had been submitted to operation, the ulcer being treated by suture, and the peritoneum washed out. 58·1 per cent. of them recovered. The average time in the

successful cases that had elapsed between perforation and operation was 23 hours; in the fatal cases 32·6 hours.

I am permitted by Mr. Sargent to reproduce an illustration which shows very clearly the position of the ulcer in 77 examples of perforation, and you will notice how much more frequent the perforations are on the anterior than on the posterior surface. His series thus confirms the recognised fact as to the greater frequency of perforations on the anterior surface, these being anterior 66, represented by black dots; posterior 11, represented by circles.

The results of operation in the second half of the period which he has selected are better than in the first. Cases are recognised and sent into hospital earlier, and operation is more quickly and surely performed.

For the first five months of this year, 1910, the numbers of perforated gastric ulcers at St. Thomas's Hospital were 9,—3 male, 6 female, with 8 recoveries. In all the anterior surface was affected. The average interval in the cases which recovered between the perforation and time of operation was 12·47 hours.

In these cases the symptoms, which are grouped under the word "peritonism," are usually very marked, the pain causing signs of distress which are unmistakable. There is considerable variation as regards the amount of shock; sometimes it is so excessive that nothing can save the patient. Shock is followed by collapse, and the patient dies in a few hours without response to medical treatment. In the autumn of 1905 a girl was admitted to the care of Dr. H. Mackenzie with a history of sudden seizure of pain in the region of the stomach so severe that she screamed out and had to be carried home from the tram out of which she had just alighted. When seen at the hospital about an hour later the diagnosis of gastric perforation was confirmed, but the state of shock was so profound that all means to combat this, including saline infusion into the veins, were without success, and the patient died within six hours. She was quite unconscious, made no resistance to abdominal examination, nor did she complain of pain. There was a large perforation, about the size of a penny, in the anterior wall of the stomach, near the pylorus. A curious fact noted by Dr. Harwood-Yarred was the presence of extensive gaseous emphysema of the body a few hours after death.

As a rule the patient rallies from the shock and other symptoms develop which resemble those met with in perforations of other parts of the digestive tract. In gastric and duodenal cases perhaps more than in others the previous history is of importance, especially if morphia has been given to relieve the pain. There is no drug which has a power like that of morphia to mask symptoms, and many a case has been lost owing to the injudicious administration of the drug in an attempt to relieve the pain at all costs. It is not wrong to give this drug when the diagnosis has been made and the course of action decided upon, but there must be no subsequent going back because the patient "appears" better.

In a large percentage there is vomiting after the perforation, but the absence of vomiting is not against the diagnosis of perforation.

Probably there is no form of the acute abdomen in which there is a greater amount of fluid to be found free in the peritoneum. At the operation only a few hours after a perforation has taken place one has been surprised to find the flanks and pelvis quite full of a thin greenish fluid, acid and sour-smelling. This statement applies to cases in which the stomach was comparatively empty at the time as well as to those in which the perforation followed a large meal. Much of it is doubtless of a protective character thrown out from the surface of the bowels and omentum in response to the irritation of the acid contents of the stomach. In this respect it resembles very closely the condition which obtains soon after a sudden rupture of the wall of an appendix abscess, or an empyema of the appendix, and the escape of the pus into the peritoneum.

Rigidity of the recti muscles in the upper part of the abdomen will be present with great tenderness in the epigastric region.

In any case in which there is a difficulty in diagnosis between a perforated gastric ulcer and an acute diffuse peritonitis secondary to a gangrenous appendix, the presence of much free fluid, as determined by percussion within a few hours after the accident, should give a strong leaning towards the stomach as the site of the mischief causing the symptoms. A tympanitic note over the liver region in an abdomen which is not distended is a very

important proof of intestinal perforation, and is commonly observed in gastric perforations soon after the sudden onset of pain. Its absence must not, however, be regarded as a reason for postponing operation in a case otherwise calling for it. It was not present in the following instance of severe perforation, in which the accident occurred although the patient was under exceptionally advantageous conditions, the stomach having had rest for two days.

J. M., a groom, aged 48, was admitted under the care of Dr. Hector Mackenzie on September 30th, 1904, with symptoms of gastric ulcer. (From notes by Mr. Birks, house surgeon, and Mr. A. J. Cooke, dresser.)

The history of the case was that he had been often sick in 1902 and 1903. Vomiting occurred about half a hour after food, and the vomited material was very acid. In January, 1904, he vomited a large amount of blood which was quite black; this vomiting recurred a few days later. In July he had a similar attack of hæmatemesis.

When admitted he was suffering a good deal from pain in the epigastric region, and was obliged to lie on the left side. The abdomen was normal in appearance, and with the exception of tenderness in the epigastrium was without evidence of disease. He was sometimes unable to keep down milk.

In the next few days he complained at times of severe local pain, and hot fomentations were required for his relief. Vomiting also occurred at intervals. On October 22nd, it was decided to put him on rectal feeding, and give nothing by the mouth.

At 2 a.m. on the 24th, he had a severe attack of pain, perspired very freely, and his pulse rose to 120.

When seen with Dr. Hector Mackenzie 12 hours later he was evidently suffering acutely. Lying on his back with head and shoulders raised, he looked pale, agitated, and intensely anxious, whilst his face and forehead were covered with sweat. His respirations were hurried, painful, shallow and irregular, the pulse rapid and he complained much of pain in the abdomen; he was unable to take a deep breath on account of the pain, and on examination of the abdomen it did not move much with respiration. It was generally tender, rigid, and rather distended. The liver dulness had not disappeared; there was dulness in both flanks,

also across the lower abdomen above the pubes. He had vomited. The temperature was 100·6°.

Operation was performed as soon as possible. On opening the peritoneum there was a flow of greenish, thin, sour-smelling fluid. The stomach was somewhat adherent to the under surface of the liver, and when they were separated by the finger there was a gush of free gas. The finger was passed to the pyloric region at once because of the diagnosis of perforation of ulcer in that situation made by Dr. Hector Mackenzie. A sharply cut ulcer, large enough to admit the forefinger, was found on the anterior surface of the pyloric end of the stomach. The stomach wall round this perforation was much thickened. The opening of this ulcer was closed with interrupted sutures. The peritoneal cavity appeared to be filled with the greenish fluid, there being large collections in the pelvis, the flanks, the subhepatic and splenic regions. A counter-opening was made above the pubes, and the whole abdomen thoroughly irrigated with normal saline. The intestines were not much distended. The deposit of lymph was limited to the parts around the perforation. Normal saline to the amount of two pints was passed into the median basilic vein during the operation, as the pulse became very feeble and rapid. The stomach was a good deal dilated. The upper wound was closed, and a glass drain placed in the lower one. Recovery was slow, but satisfactory, and he left on December 7th, 1904, for his home in Devonshire. From recent accounts it is probable that he is now suffering from pyloric obstruction and dilated stomach; indeed it would be very strange if he escaped this complication, for the induration surrounding the ulcer compelled the infolding of an unusual amount of stomach wall.

In the diagnosis of gastric perforations, I do not think that sufficient attention has been paid to the valuable information to be obtained by percussion. In nearly every case the amount of free fluid present is considerable, and it can be detected quite early accumulating in the flanks. It should not be possible for any case of acute abdominal pain to be introduced to the surgeon with the peritoneum full of fluid and no diagnosis made. The presence of this excess of fluid helps us to place out of court such conditions as pneumonia, diaphragmatic pleurisy, thrombosis of

the superior mesenteric vein, various kinds of poisoning, and acute dilatation of the stomach. There are mainly four states of the acute abdomen in which we get an excess of fluid: perforated gastric ulcer (or duodenal ulcer), rupture of an appendix abscess, rupture of extra-uterine fœtation, and ruptured pyosalpinx. As a rare occurrence it is seen in a ruptured empyema of the appendix. A case in which there is reason to suspect gastric perforation should be carefully examined for the signs of free fluid, not only at the time when first seen, but every hour afterwards, for there are few emergencies that better repay prompt surgical attention. And the fluid collects quite early.

In all, the ideal operation is one which includes closure of the perforation by means of suture; but occasionally it is not possible to apply sutures, for you may not be able to reach the opening, or the thickening may be so great that you cannot infold the stomach wall. Under these circumstances a piece of omentum may be sutured over the hole, a drainage-tube may be passed into the opening and secured by a stitch, gauze being used to pack it off; or a cigarette drain may be passed to the position of the ulcer and removed in from 36 to 48 hours. A gastro-enterostomy may be performed under these circumstances by either the anterior or posterior methods, if the condition of the patient admits of it. As a rule the additional operation of gastro-enterostomy should not be performed if the ulcer can be sutured. I have known the extra strain on the resources of the patient prove more than could be borne. Before closing the incisions after flushing carefully, examine for a possible second perforation. In some instances the patient may be too bad, and he must take the risk; you would remove his last chance by searching the posterior surface of the stomach after an operation in the late stage. In one case under my care I expressed a desire to examine the posterior surface of the stomach, but could not do so, although I thought it possible he had a second ulcer there, for the collapse was so intense it seemed hardly possible to get the man off the table alive, and, indeed, he died soon afterwards. A large perforation existed in the posterior surface, in addition to the one which had been sutured in front of the stomach.

If no ulcer is found on the anterior surface of the stomach (and any accumulation of lymph may hide a small perforation),

the duodenum should be examined. In 10 per cent. of the cases collected by Paterson, the ulcer was on the posterior wall. Access to this should be gained by tearing through the lesser omentum and inverting the anterior wall, after which sutures can be applied.

The epigastric wound should be closed by suture in the usual manner, and a drain placed in the pelvis through the lower incision, as part of the usual routine.

Perforations of Duodenal Ulcers

These ulcers are far less frequently met with than the gastric, and it is not always possible to diagnose the one from the other. They are far more common in males. Osler[1] says they may be distinguished by the following definite characters: "(*a*) Sudden intestinal hæmorrhage in an apparently healthy person, which tends to recur and produce a profound anæmia. Hæmorrhage from the stomach may precede or accompany the melæna. (*b*) Pain in the right hypochondriac region, coming on two or three hours after eating. (*c*) Gastric crises of extreme violence, during which the hæmorrhage is more apt to occur. Certainly the occurrence of sudden intestinal hæmorrhage, with gastralgic attacks, is extremely suggestive of duodenal ulcer." Unfortunately, in many cases, there is no history of local pain preceding the acute attack.

From the surgeon's point of view they are especially interesting, because it is frequently very difficult to distinguish perforations of these ulcers from acute disease of the appendix with peritonitis, especially if the appendix is situated to the outer side of the cæcum, or has never attained its proper position in the iliac region. It must be remembered that occasionally the perforation may be accompanied by an appendicitis.

When the perforation is that of an ulcer of the stomach, the symptoms are those of a general peritoneal invasion; when the perforation is in the duodenum, the escaping fluid flows down the right side, by the side of the colon, into the pelvis. In these cases, therefore, the resemblance of the attack to one of acute perforative appendicitis is very close, and a mistake has been

[1] "Principles and Practice of Medicine," p. 400.

made by the most experienced. Moynihan[1] states that in 51 cases collected by him, a correct diagnosis was only made in two, whereas the primary incision was made over the appendix in 19.

At the time of operation the appendix may be found surrounded by an area of inflamed peritoneum, and may be itself so inflamed that the surgeon is misled. It would be well, therefore, to examine the duodenum in its first part, when the apparent disease of the appendix is not manifested by gross naked eye change, such as gangrene or perforation.

Do not forget to examine the pelvis for extravasated fluid; failure to do so in any case of perforation may prove fatal, whether the ulcer be of the stomach (anterior or posterior surface) or other parts of the digestive tract.

In the following case diagnosis was easy, for not only was there a clear history of pain, but the amount of fluid was large:— A cabman, aged 39, was admitted to the care of Dr. Mackenzie, in St. Thomas's Hospital, on June 13th, 1907, complaining of much pain in the abdomen. He had suffered from pain in the epigastrium for ten years, coming on about an hour after food; also from a feeling of distension and flatulence, but had never had any vomiting. The attacks had come "off and on." Six weeks before admission he had noticed that his motions were black. At midnight on June 12th he had taken a glass of beer, the drinking of which was followed immediately by violent pain in the abdomen. This was worse over the pubes. He vomited 1½ hours afterwards and was in great pain all night, and he had constant aching pain in the right shoulder.

On admission he was in a condition of collapse with a pulse of 140, and temperature of 99°. There was marked tenderness all over, but more especially down the right side, and dulness in both flanks. The muscles of the abdomen were very tense. Sixteen and a half hours after perforation an epigastric incision gave exit to a gush of fluid and gas, whilst another incision over the hypogastric region gave freedom to much more. The ulcer was found in the first part of the duodenum. Saline infusion was required during the operation, and had to be repeated later in the day. On June 29th, a subdiaphragmatic abscess was opened, after resection of part of a rib. He left hospital on July 31st.

[1] *Lancet*, 1901, Vol. II., p. 1658.

Perforations of Gastro-Jejunal and Jejunal Ulcers

The knowledge that an ulceration of the jejunum is one of the forms of disease of the small intestine, which must be considered by the surgeon of the present day, was due in the first place to Brauns. In 1899 he met with a case in which an ulcer of that part of the small intestine perforated and produced a fatal peritonitis eleven months after a gastro-jejunostomy for pyloric stenosis in a man aged 25. In this instance the operation had been by the posterior method, and the ulcer was found at the post-mortem examination. Since that time there have been recorded many cases in which ulceration of the jejunum has required surgical treatment, and in all of them the operation of gastro-enterostomy had been performed for the relief of some form of gastric ulceration, or the result of it. From a clinical point of view they may be divided into two classes, the chronic and the acute perforative. In the former we are most likely to get an ulcer which will produce local symptoms before perforation into the peritoneum, if it does perforate; in the latter no warning is given, but if the patient has previously had a perforation of a stomach ulcer he thinks that a similar accident has occurred again. I have purposely refrained from using the term "peptic" as applied to these ulcers, for it is not proved that they are all of them due to hyperacidity of the gastric juice; indeed in more than one the state of the gastric juice has been definitely described as normal. The appearance in three out of the four perforations of this kind that have been under my personal notice was similar to that of some acute perforated gastric or duodenal ulcers. They also resembled the ulcers (to be mentioned later) in two cases of perforation of the ileum during the course of typhoid fever, in which operation was (successfully) performed at the request of Dr. Hector Mackenzie;[1] the naked eye appearances were quite similar. Some of them are probably due to an acute bacterial invasion, but I do not think the term "peptic" should be used. It is an interesting fact, however, that they are only met with after the operation of gastro-jejunostomy, and chiefly after the anterior operation—for example, out of some 54 cases 12 followed posterior gastro-jejunostomy, 1 the supracolic

[1] *Lancet*, 1903, Vol. II., p. 865.

operation, 2 the "en-y" operation of Roux, 11 the anterior operation, combined with entero-anastomosis, and no less than 28 followed anterior gastro-jejunostomy alone.

The most startling complication of jejunal ulcer is acute perforation when the patient is apparently quite well in health, and in this, as in its other complications, it resembles the common simple ulcers of the digestive tract. This accident happened in 21 patients, but inasmuch as in two of them it occurred twice at considerable intervals, 23 instances are now known. Operation performed at the earliest opportunity was successful in saving life on nine occasions (Goepel, 2[1]; Hybrinette, 1[2]; Maylard, 2[3]; Battle, 4). This improved record of results for perforation makes it appear that operation for that accident has rendered it less dangerous than the slow extension of an ulcer which is shut off from the peritoneum by means of adhesions. The formation of a localised abscess is known to follow at times, and may lead to a fæcal fistula, but it may be necessary to operate for the local ulceration, on account of the troublesome symptoms which it causes. This has involved resection of the ulcerated bowel, the jejunal end being placed into the stomach and the duodenal end into the side of the jejunum lower down. The careful synopsis of cases given by Mr. Paterson[4] in his paper on jejunal and gastro-jejunal ulcer, is most useful and full of interest to all engaged in the practice of abdominal surgery. By a perusal of the short histories of these cases it is possible to get some idea of the extensive treatment occasionally required, but this is outside our present consideration, as are many questions, which are considered in that paper.

The cases which have been under my treatment are as follows:—

Case I.—J. F. L., a clerk, aged 30, was admitted to City Ward, St. Thomas's Hospital, July 15th, 1904, for acute abdominal distress. (Mr. T. Guthrie was house surgeon and Mr. Robson dresser of the case.) He stated that about four hours before admission he had been seized with violent pain in the abdomen, vomiting and hiccough.

[1] "Kongress bericht," 1902, p. 10.
[2] *Revue de Chirurgie*, 1906, p. 30.
[3] *Lancet*, 1910, Vol. I.
[4] *Transactions R. Soc. Med.*, June, 1909.

On admission the abdomen was moderately distended and did not move on respiration. A rounded prominence was visible in the epigastrium, and immediately below this another and smaller prominence, the latter being situated immediately above the umbilicus. Distension was most marked in the epigastric and umbilical regions, and there was obvious fulness of the flanks. There was no hyperæsthesia of the skin, but considerable, yet not intense, tenderness. No definite tumour could be felt. The resonance was impaired in both flanks, but no fluid thrill could be felt, nor was the dulness a shifting one. Elsewhere the note was of a tympanitic character, this being especially marked in the epigastric region. The liver dulness was entirely obliterated, the note over the region of the liver being decidedly tympanitic. The general condition of the patient was good. Temperature 98°. Pulse 100. Respirations 20.

The presence of a scar in the abdominal wall caused questions to be asked about previous operation, and the following history was obtained, some of which was subsequently verified. He had suffered from indigestion after he became 16 years old, and three years before was much troubled with vomiting from a quarter of an hour to two hours after food, and on one or two occasions he brought up blood. Twenty-two months ago he underwent an operation in Queen's Hospital, Birmingham, for pyloric obstruction after gastric ulcer. Anterior gastro-enterostomy was performed, a Murphy's button being used to approximate the parts. His progress after this operation was uninterruptedly good until March 4th, 1904, when he was seized with pain in the abdomen, and had to go into the hospital again for "obstruction"; at this operation the Murphy's button was removed.

At the operation, which was performed about five hours after the commencement of symptoms, an incision was made to the left of the middle line above the umbilicus through the rectus sheath, the muscle being temporarily displaced outwards. There was a rush of gas when the peritoneum was opened and a greatly distended coil of bowel presented below the wound; this was punctured and emptied of much gas. The opening was closed with Lembert silk sutures and the coil returned. The stomach, which was much distended, was drawn into the wound; the point of attachment of the small intestine to the gastric wall was

defined, and a small, round, perforating ulcer, about a sixth of an inch in diameter, located in the anterior part of the jejunum at a distance 1¼ inch from the point of attachment of the latter to the stomach. The stomach and the upper part of the jejunum were as far as possible emptied of gas through the ulcer, and this was then turned in with a single row of Lembert's sutures. The coils of jejunum in the immediate neighbourhood of the perforation were greatly distended, thickened, and of a dull red colour. A small amount of free purulent fluid was present in the abdominal cavity, with patches of lymph on the intestinal coils. A second incision was made in the middle line above the pubes, and the peritoneal cavity thoroughly irrigated with normal saline solution. A Keith's drainage tube was then inserted into the pelvis through the lower incision, and the upper wound closed. The man's general condition at the end of the operation was satisfactory.

There is not much to record in the after progress of the case. He was sick three times during the night following the operation, bringing up each time large quantities of greenish fluid. In the morning a turpentine enema was administered with a very good result. Sulphate of magnesia (two teaspoonfuls) was given every four hours. The abdomen was very slightly distended and not very tender, it moved to some extent with respiration, though not freely. Pulse 104. Respirations 20.

The bowels acted again on the following day, the abdominal distension subsided, he became much more comfortable, and towards night the sickness ceased. The Keith's tube was replaced by a rubber one of smaller size, there being very little discharge. Two days later this was removed altogether. He left the hospital on August 8th, having completely recovered.

The second case was a very interesting one, being almost unique from the course of the various conditions for which operation was required.

K. F. C., aged 37, an unmarried woman, was sent to the hospital by Dr. J. Scott Battams, and admitted under the care of Dr. Hector Mackenzie, on March 25th, 1903, with symptoms of perforated gastric ulcer, which had commenced 4½ hours before. (Mr. Vaughan was house surgeon and Mr. Thompson dresser.) Operation was performed by me at 11.15 p.m., and an

ulcer near the pylorus and on the anterior surface was found and sutured, the peritoneal cavity washed out and the pelvis drained. At the operation it was noted that there was already a good deal of narrowing of the pylorus. She left hospital on May 12th and continued well until October, after which gastric pains recurred. She was readmitted in April, 1904, and anterior-gastro-jejunostomy performed. The stomach was dilated, the lower border reaching the level of the umbilicus. The pylorus was much strictured. The operation was on the 8th, and she left hospital on the 28th April.

She appears to have done very well afterwards and regarded herself as cured, until May 5th, 1905, when she was again sent to the hospital by Dr. Battams.

About six hours before admission she had a severe attack of pain especially on the right side of the abdomen, with vomiting. The bowels had acted twice that day.

In the ward the abdomen did not appear distended and moved freely on respiration. The resonance was normal in all parts. Pulse 72. Temperature normal. There was slight tenderness all over the abdomen, more evident above and to the left of the umbilicus.

She vomited two or three times during the night; on the morning of the 6th the temperature had been up to 99·4°, and a distended coil of small intestine was seen above and to the left of the umbilicus. There was tenderness as before, but it was more marked over the distended coil.

When seen by me at 2 p.m. the condition was much as above described, but the distension of the small intestine in the umbilical region was greater, and there was visible peristalsis.

Operation was performed 23 hours after the first onset of pain, the abdomen being opened through the left rectus sheath about an inch from the middle line. A red and distended coil of small intestine presented which, traced upwards, led to the old gastro-enterostomy junction; from this a greatly distended coil passed downwards, on the anterior aspect of which, 1½ inch from the line of junction, was a rounded opening from which gas and intestinal contents were escaping. The coils near were inflamed, œdematous and distended, there being lymph on the surfaces near the perforation. A knife was introduced through the ulcer

and a cut made upwards, so that the line of junction between the stomach and intestine could be explored; the finger passed easily into the stomach and then into the jejunum beyond the line of junction. There had been no contraction of the openings. The continuous silk suture, which had been employed to unite all the coats of the stomach and intestine, was felt lying partly detached, and removed. It was apparently unaffected by the action of the gastric juice. After the distended coils had been emptied, the incision was closed with Lembert silk sutures, and the intestine washed with sterilised saline. A second incision was now made in the middle line above the pubes through the old scar, and the pelvis emptied of a small amount of purulent fluid which was not of offensive odour. It was well cleansed with sterilised saline, and both wounds were then sutured—without drainage. Shock was counteracted by the administration of half a pint of saline per rectum every two hours.

She soon rallied and complained of no pain. Progress was satisfactory until the 11th, when she vomited once. She vomited several times on the 16th, and again on the 17th, and on this date the pulse was quick and feeble. Her temperature was, however, normal and the abdomen moved well, and was not distended. Rectal feeding and washing out of the stomach sufficed, and no vomiting occurred after May 20th, when she was allowed to take milk in small amounts. On June 1st she was taking ordinary diet. She left on June 2nd.

She came again for operation [1] in 1906 on account of symptoms which she herself diagnosed as due to "perforation." She had not been feeling very well for a fortnight, but there had been nothing very definite. There was, however, some pain in the abdomen on March 12th which she could not localise. At 9 a.m. on the 14th she had felt a sudden increase in pain, which was now in the upper part of the abdomen, and she vomited.

At 3 p.m. she was lying on her back, with eyes slightly sunken, but not at all anxious-looking. Her pulse was 85 and temperature 100·6° F. The abdomen was moving fairly on respiration. On examination it was tender, especially to the left of the umbilicus, and still more so near the lower end of the scar representing the site of the previous operation for perforated

[1] *Clin. Soc. Trans*, Vol. XL., p. 250.

jejunal ulcer. In that region the muscular rigidity was most marked, and there was distinct swelling. There was impaired resonance towards the left flank. No visible peristalsis, the liver dulness was not changed.

Incision was made through the left rectus sheath and the muscle displaced inwards. A thin purulent fluid was present on opening the peritoneum; and a coil of distended small intestine of a dull red colour, having some patches of lymph on its surface, presented immediately under the opening. Two or three patches of yellow lymph were especially evident on the line of junction of the stomach and small intestine; one of them, of rounded shape, covered the ulcer, which had perforated, and the probe passed directly through it into the gut. It was about $\frac{1}{3}$ inch below the line of junction on the jejunum, and about the size of a crow quill. The tissues around it were indurated. A suture was put across it, and this was infolded with a row of interrupted Lembert sutures of silk. The pelvis was cleansed from purulent fluid and lymph through a second incision. Both openings were closed and healed without difficulty, and she left on April 12th. No adhesions were found within the peritoneal cavity at this operation, and when she was shown at the Clinical Society some months later there was no hernia.

The fourth was under my observation last autumn in private. He was a man of 35 who had undergone an operation in 1907 by a surgeon in Glasgow for a perforated gastric ulcer, and two months later a gastro-enterostomy by the anterior method with entero-anastomosis for the relief of pyloric obstruction. He had enjoyed good health until the morning of August 26th, 1910. That morning about half-past eight, when having his breakfast, he had been seized with a sudden pain in the upper part of his abdomen in the splenic region and had felt sick. He had not, however, vomited. Feeling himself that his symptoms were something like those which he had experienced at the time of perforation of the gastric ulcer, he immediately sent for a medical man, Dr. Currie, who recognised that something serious had taken place. He called in a surgeon who, in consultation, considered that the condition was a temporary one of colic and that the patient would soon improve. He did not advise operation. So strongly did Dr. Currie feel that some perforation had taken

place that he thought it well to get another opinion. When first seen by Dr. Currie there was comparatively little dulness in the region of the stomach to the left side where most of the pain was, but by 11.30, 3 hours after the commencement of symptoms, a dull area was evidently spreading from this spot, and from the great tenderness which existed down the left side of the abdomen and the rigidity of the left rectus, it was considered that fluid was gradually escaping and diffusing itself along this side of the abdomen towards the pelvis. I thought at the consultation that the patient had a perforated jejunal ulcer because the symptoms were similar to those in the other cases which had come under my notice, and from the fact that the patient had undergone the two operations mentioned. Operation in this case was performed at one o'clock, as soon as he could be got into a surgical home. There was some free fluid, thin and without odour, on the left side of the abdomen, running down to the pelvis. A perforation was found at the junction of a coil of intestine with the anterior wall of the stomach, being on the intestinal portion of the junction. There was induration round this perforation, and the coil of intestine, which came up to the stomach and formed the loop, was a good deal distended and much congested. The opening itself was comparatively small and was only defined on pressure of the intestine so as to force gas through it. It was closed with silk sutures, the left side of the abdomen thoroughly cleansed, some fluid mopped from the pelvis and the wound closed without drainage. The patient made a good recovery. The amount of fluid in this case was comparatively small, and of a greenish colour, without odour, but gave definite evidence of its presence and extension downwards, firstly by the increase in the dull area noticed by Dr. Currie, and secondly by the spread of the tenderness. The operation was performed so soon after perforation that no lymph had formed, and I consider that the case reflects very great credit on Dr. Currie.

There are various points in these cases which are worth recapitulating.

1. The ulcers gave no intimation of their presence until perforation occurred.

2. The symptoms were very much like those resulting from an obstruction by a band, there being localised distension

and, in one instance, peristalsis of the bowel near the perforation.

3. The distension of the bowel when exposed was found to be considerable, but it was relieved by forcing the contained gas through the perforation, after which manipulation was easy. It was not easy to find the perforation in all.

4. In no case was it necessary to excise the ulcer.

5. In two instances a counter opening was required for the satisfactory cleansing of the pelvis, but both wounds were closed without drainage in the second case. The advisability of closing the incisions depends entirely on the state of the peritoneum.

The proportion of recorded cases of simple ulcer of the jejunum to the cases of gastro-enterostomy appears very much against the anterior method of operation; but this tells as an argument less forcibly than would appear, because it is very probable that the anterior operation has been performed far more frequently than the posterior. I formerly considered that the anterior operation possessed advantages which were likely to make it the more favoured operation of the two in a general way, and that the danger of the formation of this kind of ulcer was so slight that it might be neglected in considering the question. The introduction of the posterior "no loop" operation by the Mayos has, however, given us even better results, which in my opinion constitute it the best of the numerous ones before the profession. Since the account of it was published, I have invariably performed it in cases requiring gastro-jejunostomy, if the state of parts involved permitted.

Perforations of the Small Intestine met with during the course of an attack of Typhoid Fever

This group differs from the others which we have been considering inasmuch as the "acute abdomen" develops during the course of an illness which may have already severely tried the strength and endurance of the patient. It has been calculated by Dr. Hector Mackenzie[1] that 3·3 of all cases of typhoid fever die from this complication; and further that 69·6 per cent. of them occur during the second, third, or fourth weeks of the

[1] *Lancet*, 1903, Vol. II., p. 863.

illness. His lecture is so very interesting and instructive that you cannot do better than read it for yourselves.

Dr. E. W. Goodall[1] found perforation in 35·9 per cent. of fatal cases at the Homerton Fever Hospital, and of the total number of cases, only two recovered, one after operation, the other after doubtful perforation.

Peritonism, the result of a perforation of the ileum, is often not very marked, and unless some such series of rules as those suggested for the nurse by Dr. Osler[2] in cases of typhoid be enforced, the occurrence may be overlooked. As a rule these patients are under skilled observation, therefore there is a chance for them which is not afforded many of those in our other groups. They are watched from the beginning, and preparation should be made for operation at the earliest moment if there is any sudden change in the abdominal symptoms.

FIG. 7.—Perforation of typhoid ulcer, A. Other ulcers are shown, B. (St. Thomas's Hospital Museum.)

Then again the contents of the ileum in this disease are frequently scanty, and the perforation may not admit of the escape of much fluid; at all events the sensitive peritoneum is not flooded at once with a highly irritating acid compound, the amount of which rapidly increases from minute to minute.

I give the notes of two cases of this type in which operation led to recovery.

In November, 1904, a man, aged 30, was under treatment for suppurative periostitis of the femur, and when the pus was evacuated a bacteriological investigation showed the presence of many typhoid bacilli in it. When he left the hospital the wound had closed. (This account is from the notes by the house physician, Dr. Crompton, and the dresser, Mr. Pinches.) The

[1] *Lancet*, 1904, Vol. II., p. 9.
[2] *Philadelphia Medical Journal*, 1901, Jan. 19. See also Mackenzie, loc. cit.

history of this patient was briefly as follows: At the request of Dr. Mackenzie operation was performed on July 11th, 1902, 5½ hours after the commencement of symptoms indicating perforation. There had been sudden pain in the umbilical and right iliac regions, soon followed by vomiting. There were before operation the following local signs: resistance and tenderness in the umbilical and right iliac regions, with deficiency in movement of the lower abdomen. The liver dulness was normal and there was no evidence of free fluid. The pulse was 104 and the temperature 101°. The amount of shock was slight. An incision below the umbilicus showed a round clean-edged perforation, about ¼ inch in diameter, some yellowish feculent fluid around the perforation, and a small amount of lymph.

He made a satisfactory recovery from the effects of the perforation, but returned later for pain in the thigh which subsided under appropriate treatment. He was able to return to his work as a coal-heaver in the following year, and continued to do it until the attack of periostitis to which I have alluded.

I may mention here, as a curious addition to this history that the thigh wound reopened after he left the hospital, and as recently as December, 1906, the pus contained typhoid bacilli on bacteriological examination. It is sad to relate that his wife, who dressed his wound for him, caught typhoid about August and died soon after admission to the hospital as a result of the severity of the attack.

The other patient was also under the care of Dr. H. Mackenzie, and symptoms of perforation had been noted 12 hours before operation on December 4th, 1901. (From notes by Dr. Lack, house physician, and the dresser, Mr. Chauncey.) He was a man, aged 22, and the complication developed during a relapse. At the time of operation there were pain, distension, shifting dulness, indicating fluid in the flanks, extreme tenderness in the right iliac fossa, and a complete absence of dulness in the liver region. The pulse was 94, respirations 26, and temperature 102·4°. This temperature fell rapidly to 97° after operation, but soon rose again.

Incision below the umbilicus showed a similar condition to that in the previous case, yellowish fluid, a coil of ileum, to which a tag of omentum was adherent, and when this was lifted up a

sharply-cut circular ulcer, measuring about one-eighth inch across, was seen below it.

Suture of the ulcer and cleansing of the peritoneum sufficed to prevent further local mischief, and the patient recovered.

In both instances the ulcers were of a punched out character, and did not suggest that they resulted from the spread of the necrotic process in the site of an ordinary typhoid ulcer.

The amount of shock was not severe in either patient. The rate of the pulse in the first case was increased in frequency from 68 to 84 forty-five minutes after the perforation, and to 104 three hours afterwards. In the second it was more constant at about 95 for from two to 10 hours after the onset of acute symptoms.

In neither instance was there any history of shivering, which is described by Dr. Goodall as an initial symptom in at least 26 per cent. of his cases.

The diagnosis of these perforations in the course of enteric fever is not always straightforward. Patients suffering from this disease frequently complain of abdominal pain. This has occasionally been so severe that an exploratory operation has been performed, but without any lesion being found to account for the symptom.

The signs upon which chief reliance should be placed in making a diagnosis are pain and tenderness with rigidity, and fixation of the abdominal muscles, and disappearance of the liver dulness. In one of these cases the latter sign was not evident 5¾ hours after the perforation had occurred.

A sudden drop in the temperature, in the absence of hæmorrhage, is suspicious, but there may be no change in this respect for some time.

Rarely peritonitis has been found without evidence of perforation, whilst in some instances this condition has evidently preceded the symptoms, for which operation has been undertaken.

I do not think that there is now any real difference of opinion amongst surgeons regarding the necessity for operation in cases of perforation occurring in the course of typhoid fever. There should not be any amongst physicians. The fact that exploration has not revealed a perforation in every instance in which the

abdomen has been explored is not against it; a fatal ending is assured in practically every case if the perforation is not treated by operation.

As a rule, the incision should be made through the right rectus muscle, or in urgent cases through the linea semilunaris. Suture of the perforation should always be carried out, if possible, the formation of an artificial anus, or the re-section of the part of the intestine affected, giving very unsatisfactory results.

Operation, to be successful, must be early. You must not wait for recovery from collapse. Armstrong says that in ten operations performed during the first 12 hours there were four recoveries; but that in ten done during the second 12 hours success was only once obtained. All those died which were operated on 24 hours or more after the onset.

Ashurst states that two out of 31 cases recovered in the third 12 hours, and 18 out of 55 when more than 36 hours had passed.

A curious clinical observation has been recorded by Dr. Poynton, who discovered much fluid in the peritoneum of a typhoid patient in the early stages of the disease. The attack was acute, and Widal's reaction had proved negative. An operation was performed, as it was thought it might be a case of acute perforation of the appendix. On opening the abdomen no disease of the appendix or perforation of the bowel was found. The whole of the peritoneum appeared to be much congested, no lymph was present, but a considerable quantity of almost clear fluid escaped through the incision. The wound was closed, and the patient recovered, after a typical attack of typhoid fever. The bacillus typhosus was found in the fluid. This occurrence of fluid in the peritoneum of a typhoid patient is very unusual, but is a thing to be remembered, as a somewhat similar condition was found in a patient subjected to an operation for typhoid perforation by Mr. Gordon Watson.[1]

A female, aged 11, the 26th day of the disease. Operation about an hour after the first symptom. Dulness in flanks when first examined, and "the abdomen absolutely full of fluid" when opened. Ulcer, 18 inches from the valve, closed with suture. Peritoneum everywhere injected, but quite glossy.

[1] See *Trans. of the Med. Soc. of London*, p. 368, 1908, Vol. XXXI.

It is evident that this fluid had been present before the signs of perforation were manifested.

Perforation of Stercoral Ulcers

As recently as 1896 the late Mr. Greig Smith wrote about stercoral ulcer: "Although no special description of this disease has, so far as the writer knows, been written, and although it is not of frequent occurrence nor of great importance, yet its undoubted existence and real gravity may justify its being classed under a separate heading." He then mentions a few instances of intra-abdominal abscess, in which a foreign body was found, but admits that some of them were most probably due to disease of the appendix. He writes: "The condition as I have met with it is simply a diffuse subperitoneal cellulitis," and he evidently regarded it as always dependent on the irritation of a foreign body. Some of the abscesses that I have met with on the right side of the abdomen may have been of this mode of origin, but they were mostly secondary to perforations of the appendix.

Mr. J. Bland-Sutton has given examples of fæcal abscess, associated with small but sharp foreign bodies, in the large intestine; and Dr. H. D. Rolleston, in a paper on "Pericolitis Sinistra," gives instances in which ulceration developed in a diverticulum of the colon, and produced suppuration beyond. These ulcerations were rightly called stercoral, but were not, like the common variety found, secondary to an obstruction of the bowel below.

But outside these groups of cases, stercoral ulcers behave very much as ulcers in other parts of the digestive tract; they may perforate suddenly and produce general peritonitis; or extend gradually, and give rise to a localised intraperitoneal abscess. When it is remembered that these ulcerations are usually secondary to a condition which of itself is seriously threatening the patient's life, it can be appreciated why they prove so fatal. The patient, who is most frequently suffering from chronic intestinal obstruction, caused by carcinoma of the large intestine low down, appears to have his last chance of recovery taken away if a stercoral ulcer perforating suddenly floods the peritoneum

with the very septic contents of the bowel above the obstruction. In a patient, already weakened and distressed by the obstruction, this additional attack is usually more than can be successfully combated, and proves fatal.

When anyone the subject of chronic intestinal obstruction of a mechanical kind complains of sudden increase in abdominal pain and has a rise of temperature, not necessarily a very high one, the possibility of the giving way of a stercoral ulcer must be remembered. This possibility is increased if there is, in addition, an excessive sensitiveness to palpation, previously absent, but perforation may give no immediate sign of its occurrence, as in the following instance: Some years ago I was asked by Mr. C. Mortimer Lewis, then of Steyning, to see a lady with him, who had carcinoma of the rectum. She was over 80 years of age, and had only sent for him that morning because her bowels had not acted for a week. He examined the abdomen, found it much distended and tympanitic, whilst the rectum was completely blocked by a carcinomatous growth. When we saw her together a few hours later she was much the same, but without any vomiting. Her temperature had been 100° F., the pulse was good, but the tongue was brown and dry. Incision was made to perform colotomy in the left iliac region, but when the peritoneum was opened it was found to have been flooded with black liquid fæcal matter, which was still escaping freely from two ragged openings in the immensely distended sigmoid flexure. These openings (with thin and irregular edges) were situated one above the other in the anterior part of the bowel, which passed down behind the middle line of the abdomen. Pints of this offensive fluid came away before it was possible to secure the sigmoid flexure to the abdominal wall. The peritoneum was cleansed as well as possible, but the patient did not rally from the operation. In this case it is possible that the bowel had given way in the morning, when the patient sent for her medical adviser. Up to that time she had for some days gone on, taking dose after dose of medicine without any relief, whilst the immense accumulation of fæcal matter above the constriction had caused excessive stretching and local injury to an area of the bowel, which had ended in acute bacterial necrosis. The necessary removal from the bed to the operating

table may have caused a further escape and diffusion in the peritoneum.

Treatment of this most unfortunate complication should be directed, as in this case, to the cleansing of the peritoneum, the insertion of a Paul's tube in the opening from which the fæcal matter is escaping, and the securing of the damaged bowel to the part of the abdominal wall most easily reached. Strain on the wall of the bowel, usually softened and easily torn, must be avoided. By this means the opening will serve as a colotomy opening and the obstruction relieved. The difficulty in cleansing satisfactorily the fouled peritoneum will render the prospect of recovery doubtful. Yet success may occasionally be obtained.

On March 27th, 1901, I saw a patient in consultation with Dr. S. Faulconer Wright, of Lee. He was 71 years of age, and stated that he had always been healthy until the 21st of that month, when for the first time he experienced abdominal pain. This was accompanied by vomiting and constipation. Since that time the pain had continued with occasional vomiting, and the bowels had not acted. The abdomen was much distended and tympanitic, the note around the umbilicus being high pitched. There was no diminution of the liver dulness, and no evidence of free fluid in the peritoneum. The tenderness was not extreme, but he winced when touched. His general condition was fair, and the temperature was normal. An incision was made in the middle line below the umbilicus, and when the peritoneum was opened free gas escaped, and fluid fæcal matter was seen covering the intestine in the region of the cæcum and extending into the pelvis. This had come, and was still escaping, from a stercoral ulcer on the anterior surface of the distended cæcum, which had recently given way. It was large enough to admit the little finger, and its outline was somewhat irregular, with a thinned edge. Into this a Paul's tube was passed and secured, the cæcum being sutured to an incision in the right iliac region. After the bowel and peritoneum had been cleansed as thoroughly as possible, a long drainage-tube was passed into the pelvis and the median wound was sutured. The small intestine was generally adherent, coil to coil, and fixed in the posterior part of the abdomen, evidently the result of an old attack of peritonitis (probably

chronic). Under the skilful management of Dr. Wright the patient recovered, and was still able to go daily to the City to business when I last heard of him. The artificial anus never closed completely, and gradually, as time has gone on, this opening has become more important, until hardly any fæcal matter finds its exit by the natural anus. The patient wears a flat, circular indiarubber bag, containing a large flat sponge, fitting accurately to the abdomen over the artificial anus. The dieting has to be very carefully arranged, on account of occasional stoppages, which, when they occur, cause considerable pain, which is only relieved by the escape of fæcal matter by the artificial opening. His general health has remained excellent. What at the nature of the obstruction was in this case it is impossible to say; the fouling of the peritoneum and the condition of the patient made it inadvisable to explore. The complication of perforation was such a serious one that the clear indication was to deal with that, more especially as its treatment was calculated to give relief to the obstruction which was responsible for it. The cleansing of the peritoneum was no doubt aided by the limitation of the fouled area in consequence of the old intestinal adhesions. The after-history of the case is instructive, inasmuch as the obstruction has often recurred, and a "safety-valve" action has permitted of relief on each occasion. It was thought at the time of operation that the obstruction was caused by a carcinoma of the sigmoid flexure, the growth of which is sometimes very slow; anyway, the case is a most instructive and encouraging one.

The surgeon of the present day considers that chronic intestinal obstruction should be rare in actual practice; there must be some neglected case, but it should not be met with so often in good hands as it is. Our knowledge of the early symptoms, and of the great possibilities of successful treatment, is so much better than it was only a few years ago. However, I am not dealing with that condition in considering the acute abdomen; for although a chronic obstruction may become acute, the diagnosis is easily made, whilst the indications for treatment are usually straightforward.

Stercoral ulcer is one of the most serious complications of chronic intestinal obstruction, even when the peritonitis produced

is purely local in its character. In any adult with a history of chronic constipation who gives an account of a more recent attack of pain, usually in the right side of the abdomen, which has been followed by a rise of temperature, examination should be made for the signs of localised extravasation of fæcal matter into the peritoneum. If there is an ill-defined area of dulness in the cæcal region, with tenderness and a sense of resistance, whilst rectal examination shows an apparent thickening on the right side of the pelvis, this complication should be suspected. Fluctuation may be found if the case is seen at a later stage. Should the patient be fat and nervous the diagnosis may be very difficult; even with the assistance afforded by the administration of an anæsthetic it may be hard to say that there is much wrong with the side really affected. There is nothing like the definite induration which is found in a case of localised inflammation or suppuration secondary to a disease of the appendix, which it resembles closely in some other respects. It comes on in a person suffering from intestinal disturbance; the pain is in the right iliac fossa, and is accompanied by increased distension of the abdomen and a rise of temperature. Tenderness is more marked in the right iliac fossa than in other parts of the abdomen. Yet there are differences—a stercoral ulcer, giving rise to a localised extravasation and abscess, is specially met with in elderly females who give a history of chronic constipation, recently more obstinate, and associated with "wind in the stomach." The rise of temperature is not great, and the area of tenderness is not so easily localised as in appendicitis.

The collection of fluid fæces which forms in the peritoneum has a tendency to spread laterally, and it may be the operator will find it up to or beyond the middle line should he make an exploratory median incision to find out the exact site of the obstruction when there is a doubt. Whether he thus discovers it by accident, or makes direct or intentional incision into the abscess, a counter opening and the insertion of a large drainage-tube will generally be required. If the opening into the cæcum be found, a tube should be passed into this, so that the contents of the bowel, which will escape freely, may be conducted beyond the abscess cavity. The contents of the abscess cavity, pus mixed with fluid fæcal matter, are extremely offensive, more so

than most abdominal collections of a purulent character, and that is saying a good deal.

Under the best conditions the prognosis is bad; the discharge of large quantities of fæcal matter, with an increasing admixture of pus, causes much local irritation, and may end in rapid exhaustion. Should the inflammation subside, and an artificial anus form, it is not placed in a convenient position, and may lead to all the disadvantages of a colotomy opening on the right side—that is, if the obstruction becomes complete. The case under the care of Dr. Wright suggests the possibility of a more satisfactory course of events, the opening acting as a safety valve when required by the temporary stoppage beyond, and causing but little inconvenience in the intervals. Another danger in these perforations is the tracking upwards of the pus and the formation of a large collection in the subhepatic or subphrenic regions; a second incision would be required for the better drainage of this extension, but exhaustion from the discharge would not unlikely be the ultimate ending of such a case. It will be evident that recovery from these collections will take some time, during which the original cause of the trouble—probably a malignant growth—is increasing in size and becoming more difficult to treat satisfactorily.

IV

ACUTE INTESTINAL OBSTRUCTION

In the calculation of the percentage of causation of "the acute abdomen," it is found that acute obstruction is responsible for no less than 24 per cent., without including the cases of intussusception, which of themselves constitute 16 per cent. The forms of acute obstruction which are most common, and therefore most likely to be confused with some of the varieties of peritonitis due to perforation of the hollow viscera, are those caused by the action of various forms of bands. Here the resemblance may be very marked, whether the obstruction is incomplete or whether it is complete and the strangulation of bowel absolute. The cases of incompletely strangulated bowel may closely resemble some of the more insidious forms of peritonitis due to perforation or gangrene of the appendix. There may be a history of previous attacks of abdominal pain, and perhaps signs of an exudation of free fluid into the peritoneum are found on examination, with localised tenderness. The temperature record is important, as is also the mode of onset of the attack, a rise of temperature, and maybe an initial rigor, being much in favour of the purely inflammatory nature of the illness.

"Peritonism" (Gübler)—abdominal pain, shock, vomiting, etc.—is such as described in the cases of perforation of ulcers of the digestive tract, and the same careful examination of the abdomen and consideration of symptoms will be required. The character of the pain is of little value, but it is usually much increased by percussion (even when quite g ntly performed) in peritonitis, more so than by palpation. In obstruction percussion is always painless, while palpation is more often painful. The abdomen in peritonitis is immobile and rigid, whilst in obstruction it is mobile and soft. Vermicular movements are more commonly seen in obstruction, but may be found in

localised diffuse peritonitis as in the cases of perforated simple ulcer of the jejunum already described.

In the severely toxic form, or the last stages of peritonitis, the abdominal wall, previously rigid, becomes soft and pliable again. As a rule, in the perforations leading to peritonitis the patient lies quiet, with flexed thighs; in obstruction he moves about in bed, altering his position to that which appears for the moment to be most comfortable, and complains of griping pain. In all a careful search should be made for any abnormal swelling, which in acute obstruction may be found in various parts of the abdomen. As the case progresses general distension of the abdomen increases and any localised swelling will be gradually merged in the general enlargement. Septic absorption and inflammation are superadded and the case practically becomes one of peritonitis of the most grave nature. If seen for the first time at this stage a diagnosis of the exact cause of the inflammation is impossible, but prompt measures may yet prevent a fatal termination. Luckily patients do not often permit things to progress to this extent before applying for relief.

It would be obviously impossible to enter fully into all the varieties of acute obstruction which come under the heading of "the acute abdomen." I have selected two which I think are most instructive. They represent the typically acute type of obstruction in which there must be no attempt at medical compromise; operation is imperative and must be performed as soon as possible, otherwise the condition passes rapidly beyond the power of relief.

A patient was under treatment for volvulus of the small intestine, for which it was necessary to do an extensive resection. The portion of bowel involved was the lower part of the ileum which is the usual part affected, and the twist was from right to left on the mesenteric axis.

A man, G. D., aged 28 (house surgeon, Mr. Birks; dresser, Mr. A. I. Cooke) was admitted to St. Thomas's Hospital on November 7th, 1904, with acute intestinal obstruction. At 4 p.m. on the day before admission he was suddenly seized with pain in the lower abdomen; since that time his bowels had not been opened, neither had he passed flatus. There had been vomiting off and on since the onset. The pain had been con-

tinuous in character, with paroxysms. On admission it was stated: "The patient's face is drawn with pain, he continually moans and pants. He complains of pain in the abdomen. The abdomen does not move at all in its lower part during inspiration, and movement is poor in the upper part. There is a marked prominence in the hypogastric region in the middle line, looking like a much distended bladder. The percussion note over this area is resonant and the part very tender. The liver dulness is not diminished and the abdomen appears to be normal in other parts." The pulse was 120 and the temperature was 100·6° F. Catheterism did not diminish the size of the

FIG. 8.—Continuous suture introduced after Lembert's method.

swelling. When seen with Dr. C. R. Box, under whose care the man was, the local signs had become less acute and there was less complaint of pain. Acute intestinal obstruction was diagnosed, due to volvulus of small intestine, or strangulation by a band. The patient was a strong, healthy-looking man, without any history of previous abdominal pain.

At 5.45 the abdomen was opened below the umbilicus to the right of the middle line, the rectus being displaced outwards. When the peritoneum was incised a very black coil of small intestine presented; this was very tense and hard and could not be drawn up through the wound. It was therefore punctured, and a quantity of fluid, which consisted almost entirely of venous blood, escaped; this had a fæcal odour. This coil was then brought outside and found to be the ileum immediately before

its junction with the cæcum. Another coil then presented itself and was also tapped and emptied of similar fluid contents and flatus; it was now possible to lift the whole of the affected gut out of the abdomen. The portion affected was quite black, and when emptied of its contents was without resiliency, although the peritoneal covering was not without polish. The twist which had occurred was one on the mesenteric axis from right to left,

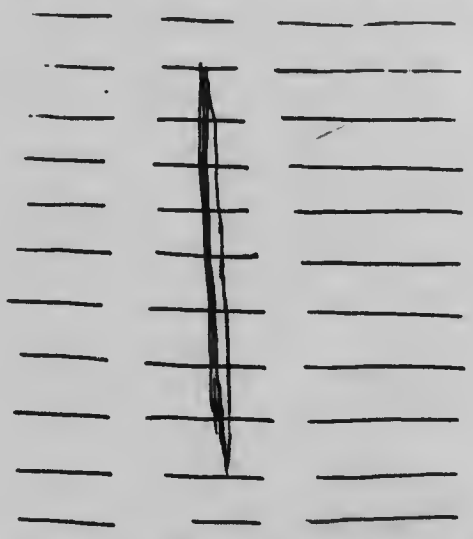


FIG. 9.—Lembert's sutures, introduced separately—peritoneum and muscular coats taken up.

but when this had been reduced no improvement occurred in the circulation of the affected portion of small intestine; it was necessary therefore to resect the whole of this, and to include an inch or two beyond. Altogether 48 inches of gut were removed from close to the ileo-cæcal valve upwards, Doyen's clamps being placed on the bowel above and below and the mesentery ligatured after the rapid application of artery forceps to each section before it was divided. The upper end was then joined to the part left at the ileo-cæcal opening with two rows of continuous sutures, an inner involving all the coats, and a continuous "Lembert" outside that. The upper part of the divided mesentery was also sutured. The pelvis contained dark, blood-stained offensive fluid. There was no lymph present on any part of the peri-

toneum that came under observation. After washing out the pelvis and cleansing the parts involved in the operation with sterilised saline solution the wound was closed with deep and superficial sutures. Chloroform was administered and during the operation two injections of 5 minims of liquor strychninæ were given hypodermically and, later, 15 ounces of saline solution per rectum. The operation was well borne.

Beyond the fact that a localised abscess probably due to a bacillus coli infection, formed in the wound and discharged a fortnight after the operation, there was nothing of moment to record in the after-progress of the case. Rectal feeding was employed for three days. There is now a good abdominal wall without hernial protrusion. We had in this case a formidable complication, gangrene of the gut, one which required very prompt measures in dealing with it. Not many hours had elapsed since the onset of obstruction, but the strangulation of bowel had been absolute.

Dr. C. L. Gibson, of New York, collected 1,000 cases of intestinal obstruction (including 354 cases of strangulated hernia), and amongst these there were 121 cases of volvulus. These were taken from various medical publications and included those affecting the large intestine, which are by far the most common, constituting practically the only form of acute obstruction of the large bowel. This form of obstruction when affecting the large intestine has a mortality of 46 per cent. When affecting the small intestine the mortality is 70 per cent. This is accounted for by the fact that the small gut is of far greater importance, whilst the vitality of its walls is probably less. When the small intestine is the subject of volvulus the symptoms are more acute, and manifestations of shock are more marked, possibly its mobility allows of a tighter twist. Knowing the tendency there is to publish only successful cases, it is very probable that Dr. Gibson's statistics are more favourable than they should be. He found only one record of successful resection for gangrene due to volvulus of small intestine and this was performed by Riedel on the second day of obstruction.

A somewhat similar condition is presented by a case of obstruction by a Meckel's diverticulum, the symptoms of which are practically those produced by any kind of band. There is

less frequently a history to guide you as to the actual cause of the obstruction in these cases; no account being given of a previous inflammatory attack or of injury, although you may at times hear of occasional "stomach-aches." Gibson gives 42 cases of obstruction by Meckel's diverticulum, as against 186 by bands of various other kinds. This seems to me to be much too high a proportion as compared with actual practice; obstruction due to a Meckel's diverticulum is not a common variety.

The symptoms produced by the compression of small intestine by a band are practically the same as those described when the

FIG. 10.—Obstruction produced by Meckel's diverticulum, A. (St. Thomas's Hospital Museum.)

cause is a twist—viz., peritonism—with the formation of a localised swelling in the lower abdomen, which swelling is resonant on percussion. Any swelling of this kind should be regarded as of the utmost importance and as an indication that nothing but operative treatment is possible. This must be at once declared by the surgeon in charge. The friends will very probably protest and the patient demand morphia for the relief of his pain, but you must be firm.

At the time of the operation the diagnosis in this case was becoming more difficult, the localised swelling having merged in the general swelling caused by the distended intestines. You

should always have abdominal operations performed before general distension sets in; in all cases the operation is much more difficult in the face of distension, and the result is likely to be so much less satisfactory.

A man, W. S., aged 46 years (house surgeon, Mr. Birt; dresser, Mr. A. I. Cooke), was admitted under the care of Dr. Hector Mackenzie, on February 26th, 1905, with acute intestinal symptoms of 12 hours' duration. Twelve hours before admission he awoke feeling out of sorts and had a headache. Acute pain soon came on in the region of the umbilicus and he vomited three times in the course of half an hour. The bowels had not acted for two days. On admission he was found to be a heavily-built man with a tendency to obesity, and was evidently enduring severe pain, which was not relieved by any change of position. The abdomen was not universally distended, but there was an obvious rounded swelling in the right iliac fossa. The respiratory movement was poor in the right lower segment of the abdomen. The greatest tenderness was immediately around the umbilicus, and the right rectus was the more rigid of the two, whilst a distinct swelling could be defined just below, and to the right of, the umbilicus. The resonance was everywhere normal, there being no sign of free fluid. The pulse was 62, and the temperature was 98° F. During the night the pulse quickened considerably and the temperature commenced to rise. At 10 p.m. two enemata were given without any result. Hot fomentations and morphine did not fully relieve the abdominal pain. In the morning the temperature was 100·6° and the pulse was 110, and the abdomen was much distended. Dr. Mackenzie was asked to see the patient at 2 p.m. and advised immediate operation, considering the case one of strangulation by band.

At the operation it was found that the cause of the obstruction was the pressure of a Meckel's diverticulum across a large amount of small intestine. The extremity of the diverticulum was firmly adherent to the mesentery and the coils of gut involved were of a chocolate colour, and without any resiliency. The mesentery was partly filled with extravasated blood and the vessels were without pulsation; the strangulation had been complete. The diverticulum was divided and most of it removed, the stump being sutured into the side of the gut. About

4 inches above this a section was made of the gut where it appeared to be healthy, and another above the gangrenous part. Altogether 46 inches were removed, an end-to-end anastomosis being effected with two continuous sutures. The peritoneum was cleansed from a small amount of blood-stained, foul-smelling fluid and the wound closed. Remedies were applied to diminish shock. Both lines of intestinal suture gave way, the sutures having apparently been placed in damaged bowel; an attempt to close these was unsuccessful, and the patient died on March 9th, from exhaustion and localised peritonitis. The diverticulum had had its origin 8 inches from the ileo-cæcal valve.

In both these cases the progress of events was rapid, the strangulated gut having become gangrenous in a few hours from the onset of symptoms. In dealing with the cause of the obstruction, in the first case it was only necessary to empty the involved intestine, and after drawing it from the abdomen twist it round in the required direction. In the second, after the band had been found (not always an easy thing, if one may judge by recorded cases), it required to be divided and the ends afterwards dealt with. I may here remind you of the necessity of examining carefully any band that may be divided during the progress of an operation for intestinal obstruction. I have known the careless division of a Meckel's diverticulum allow of extravasation of fæces into the peritoneal cavity, which unhappy occurrence resulted in a rapidly fatal peritonitis. In appendix cases we are able to excise the diseased part without interfering with the lumen of the bowel; in perforations of the digestive tract we do not seriously alter the size of the lumen by our sutures. In this group of cases we are met by a very formidable complication which requires special consideration. More or less extensive gangrene of the intestine may suddenly confront you in any acute abdominal case in which operation is performed, and you must be able to deal with it on the spot. There will be no time to send a hurried messenger for button, bobbin, special forceps, or any one of the scores of suggested mechanical aids on which you may have decided to pin your faith; in the presence of this complication you must deal with things as they are, at once, if you wish to save the life of the patient. The faith which was formerly placed in the special instrument should now be placed

in an accurate method of suturing, the judicious selection of the point of section of the gut, and in the precautions against sepsis, which are now a part of the usual technique.

There are many cases of localised gangrene in which it is found that a portion of the gut does not look sound, but of which it is not possible to say that it will not recover if placed in favourable circumstances. When the portion of bowel affected is very localised, as when the pressure of a band has produced a transverse lesion, it may be possible to invert this by a row of Lembert sutures, as suggested by Caird. I have done this with satisfactory results in cases of strangulated hernia.

The treatment of gangrene of the small intestine when the entire circumference is affected will depend on the general condition of the patient, and the circumstances of the case, rather than on the extent of the gangrene, for the procedure will be much the same whether you resect 1 inch or 1 yard. In favourable circumstances this will be that adopted in the case of volvulus: Delivery of the gangrenous part from the abdominal cavity, examination to define the extent of bowel, not only gangrenous but affected beyond this, cleansing of the part, careful packing off of the healthy area with sterilised gauze, covering of the gangrenous part with gauze to prevent possible contamination of the wound, resection, and subsequent joining of the ends. Mr. Barker's method is a very good one.

In the resection of the gut in both cases which I have recorded Doyen's clamps were used and answered their purpose well. I used them because they were handy. In other cases of resection I have used pieces of drainage tube with equal success, passed through the mesentery and secured by tying or by forceps. Strips of gauze would answer in case you had no drainage tube available. The proximal and distal clamps should be placed 2 inches above or below the line of proposed section in a healthy part. I lay very special stress on this point, because in the case of obstruction by a Meckel's diverticulum it is quite evident that the suturing failed because the stitches could not hold in tissue, which had been stretched and which underwent afterwards an inflammatory reaction and softening. The bowel appeared to be quite healthy at the time, and one was very naturally not anxious to excise more than was absolutely necessary. It is sometimes

advisable to cut the bowel a long distance away; for instance, in January, 1905, I resected 16 inches of small intestine with good result in a case of strangulated femoral hernia, although the part affected by gangrene was only about 1 inch in length. The bowel close to this was not in a healthy state. As each end of the bowel is separated it should be cleaned and wrapped in gauze until wanted. One or two vessels may require ligature. You need not excise a wedge-shaped portion of the mesentery, but if it is full of thrombosed vessels there is no object in cutting close to the part to be resected.

The junction of the two ends should be made by careful suturing with a double row of silk sutures. These should be continuous, for they are more rapidly applied than the interrupted, and are equally efficient. According to the thickness of the intestinal wall should be the size of the suture. As a rule, No. 1 is right for the adult. The first should include all the coats of the bowel; the second will take only the two outer, as a rule. In applying this, you must see that the suture has a good hold. If you are satisfied on this point, it is not advisable to dip the needle too deeply, for if you pass your outer thread into the lumen of the bowel, in the endeavour to get a supposedly stronger hold, your patient will probably do badly. When applying the deeper stitch hold the two portions of bowel with forceps, one pair applied at the mesenteric point of attachment of each bowel, the other at a corresponding point opposite. If a pair of forceps is also placed halfway between these, also closely applying the cut edges, the suture can be introduced still more rapidly. The omentum should then be sutured, so as to present no raw surface, to which adhesions can form, the parts involved in the operation cleansed, and the abdominal wound closed without drainage.

The amount of intestine resected in these cases appears large; 43 inches in one case, and 46 inches in the other. But even greater lengths have been excised. Mr. A. E. J. Barker, in a very instructive paper on the limitations of enterectomy, mentions a case in which Mr. Hayes, of Dublin, successfully excised 8 feet 4½ inches of intestine for injury in a boy, aged 10 years. Another paper by Mr. Barker will repay perusal. It is on enterectomy for gangrenous hernia. Many practical points

are brought out. He also shows that the amount of shock is much less than you might think from such an extensive operation. I have mentioned these extensive excisions of intestine to show what can be done, so that you may not be intimidated should you meet with one of these extreme cases, remembering that if the gut at the point of union is sound, and you take proper precautions in following the various steps of the operation, you may hope for a success, even in desperate circumstances.

The effect on the patient of the removal of a large portion of the small intestine is apparently very slight. In the former of the two cases of which I have just given details, there was, for a time, a tendency to looseness of the bowels; but this has passed off, and he is now in good health, excepting for occasional "indigestion." The effect on the intestine has been recorded by Mr. Barker in two cases in which he had an opportunity of looking at the bowel during life some months (in one case five years) after operation. In both, the line of union was sound and without contraction, but the bowel on the proximal side was somewhat larger than that on the distal side, and showed smaller power of muscular contraction.

V

DISEASES OF THE FEMALE GENERATIVE ORGANS

Acute Conditions arising from within the Pelvis

Several conditions of the female genital organs may be rightly considered under the heading of the "acute abdomen." The rupture of a pyosalpinx, the bursting of the sac of an ectopic gestation, the acute necrosis of a fibroid of the uterus, the twisting of the pedicle of an ovarian cyst, or the rupture of a cyst into the general peritoneal cavity are examples. Here I will bring to your notice the account of a patient who was admitted for acute abdominal symptoms, due to a ruptured pyosalpinx, and afterwards remind you of some other cases formerly under treatment in the wards, which show when it is necessary to explore the abdomen after the onset of symptoms due to pelvic mischief which has become acute. There is a certain amount of similarity in the symptoms caused by a ruptured pyosalpinx and those due to a ruptured ectopic gestation; and it is to a consideration of the more acute abdominal complications of these affections that I shall limit my observations.

The account of the case to which I have already referred is that of a patient who was under treatment in the Beatrice Ward. She is a woman, L. S., aged 21 years, who was admitted (house surgeon, Mr. Bletso[illegible] dresser, Mr. Petch) under the care of Dr. H. Mackenzie on February 20th, 1906, early in the afternoon. The history of the case was that she had been suddenly seized with abdominal pain during the night of the 19th. This pain had been very severe, had been in the upper part of the abdomen, and she had vomited. She had had a meal of pork during the previous evening. At 4 o'clock in the morning a medical man was sent for, who gave her some medicine, which she vomited. In her previous history there was an account of indigestion of indefinite character some years ago. There had

been profuse vaginal discharge for some months, and the menstrual period was a fortnight overdue. There had been no action of the bowels for two days.

When seen in consultation with Dr. Mackenzie late in the afternoon the patient was lying on her back, looking very ill and anæmic, and seemed collapsed, drowsy, and apathetic. There was a small circular flush on each cheek. The skin was dry. The respirations were somewhat quickened (24), and the pulse was 110. The temperature was 101·4° F. She complained of pain in the abdomen, which was found to be moving quite well in the upper half, but was less mobile than usual in the lower part. On palpation it was quite soft all over, but there was much complaint of tenderness, especially in the left iliac region and right up towards the liver. Nothing abnormal was found, the abdominal wall being quite without rigidity, and offered no resistance to palpation. On percussion the note over the whole abdomen was normal. The liver dulness was normal. At 5.30 abdominal exploration was carried out, an incision was first made in the epigastric region, and the stomach and duodenum closely examined. The hand was then passed downwards to the iliac fossa and appendix region and onwards to the pelvic organs. A tumour was felt to the left of the uterus. This was recognised as a pyosalpinx, and it was thought that a rupture of this would account for the condition. A second incision was made in the middle line above the pubes, and when the peritoneum was opened, thin, somewhat viscid, odourless pus was found, extending from the pelvis into the flanks. The intestines were packed off with strips of sterilised gauze, and the pyosalpinx was removed after the application of three (No. 4) silk ligatures. There was no inflammation of the peritoneal coat of the intestine, and no lymph was seen. The area of infection was cleansed with moistened sponges, and drainage was provided by a rubber tube and a strip of gauze. The right ovary was somewhat fixed by adhesions, which were freed, but appeared to be healthy, as did also the tube on that side. The upper wound was sutured in layers by Mr. Bletsoe, the house surgeon, whilst the pelvic condition was being treated. The pyosalpinx formed a tumour of the size of a hen's egg, the walls of the Fallopian tube were much thickened, and there had been a

rupture of the tube not far from the ostium abdominale, which itself had been closed by adhesion to the broad ligament. The ovary formed part of the inflammatory mass removed, and could only be distinguished on dissection. The plug was removed on the 24th; there was a small amount of clear discharge. The bowels had acted twice. The pulse was 76 and the temperature was normal or subnormal. Pain was quite relieved. This patient continued to progress satisfactorily, and left hospital on March 13th.

Pyosalpinx is recognised as the most important condition giving rise to peritonitis having its origin in the pelvis, repeated localised attacks being common. As a source of diffuse spreading peritonitis it is less frequent, for the thickened tube does not often rupture as it did in this case, and allow the purulent contents to be diffused into the general cavity of the peritoneum. There can be little doubt that the gonococcus is extensively diffused by the rupture of a tube, and although Mr. Dudgeon and Mr. Sargent[1] conclude that it possesses a slight pathogenicity when introduced into the peritoneal cavity, it does produce a peritonitis which may be ultimately fatal. We must endeavour to operate before peritonitis sets in. The prognosis is thereby immensely improved, and the duration and severity of the illness are diminished.

None of those who saw the extent to which purulent diffusion had taken place in this patient doubted that general peritonitis must have ensued had operation been delayed. It was the aspect of severe illness, with the history, which induced Dr. H. Mackenzie to suggest the desirability of exploration, for local signs of the gravity of the attack were absent. There was no trace of protective rigidity of muscle, whilst the tenderness found was not in any way remarkable. Nothing indicated the probable origin of the symptoms, and although the epigastric region was explored this was in deference to the former history of indigestion, with a recent heavy meal, rather than to any idea that stomach ulceration had really given way, for there were no localising signs. I have stated that the appendages on the right side appeared to be healthy, and were therefore not removed. It was probably right to leave them; but the result

[1] "The Bacteriology of Peritonitis," p. 53.

of so doing, in a case formerly under my care, in which a pyosalpinx had given rise to intestinal obstruction, has made me less confident of this than I might otherwise have been. The appendages on the left side appeared normal, and were therefore left, but the woman returned with septic peritonitis, the result of a rupture of the remaining tube, in the following year.

The following is an account of this case:

A woman, aged 26 years, was admitted under the care of Dr. H. Mackenzie on January 31st, 1903 (house surgeon Mr. Hudson, dresser Mr. W. Wilkinson). She stated that she had been quite well until the 25th, when she was taken ill with pains all over her. The attack passed off, but came on more severely at 4 a.m. on the 25th, and was accompanied by severe pain in the right hip which spread all over the abdomen. On admission the abdomen was distended, did not move well on respiration, and the patient looked ill. The abdomen was not tender; it was easy to examine, but nothing abnormal was detected on palpation. Examination per rectum showed nothing unusual. The temperature was 100·6° F., and the pulse was 104. On February 3rd she had an attack of abdominal pain with vomiting, there being visible distension of small intestine and peristalsis. The bowels acted well just before the attack. Operation was advised because it was recognised that she had recurring attacks of obstruction due to a mechanical condition, but she refused until February 6th, when another more severe attack of pain and vomiting induced her to think more seriously of her illness and give her consent.

Incision was made through the right rectus sheath and the muscle was temporarily displaced. On opening the peritoneum a coil of small intestine was found to be distended and to pass down into the pelvis which seemed unusually full. At first it appeared as if the uterus was very large and smooth walled, but further examination showed the swelling to consist of two parts, a softer one to the right, and when the finger was passed into Douglas's pouch a groove could be felt marking a division between them. The pelvis was packed off with sponges and a large pyosalpinx, which ruptured during the process, was brought outside, separated from its attachments, and removed. The pus was very offensive. The ovary was included in the mass removed. The left side appeared to be normal. The loop of obstructed gut

was found adherent to part of the boundary wall of the pyosalpinx which had been left behind—it was kinked from before backwards; another loop also adhered to this part, but was not obstructed. These were freed and some omental adhesions were also separated or divided between ligatures. The pelvis and lower abdomen were carefully washed out with warm saline solution, and a tube was left in which extended into Douglas's pouch. On the third day some distension of the stomach was present, and this was followed by a more or less general meteorism which very gradually subsided under appropriate treatment, although the patient was for a time seriously ill. The tube was removed on the seventh day after operation. She left the hospital on March 14th, 1903.

On October 20th, 1904, the patient was readmitted to the same ward with symptoms of diffuse peritonitis. She had enjoyed good health since leaving the hospital until three weeks before her return; she then had a menstrual period, followed a week later by hæmorrhage from the vagina which lasted for three or four days. This was followed by acute pain on the right side of the abdomen which spread to the left side. This pain continued for a week, and then for the three days previous to her coming up it increased considerably, and was again accompanied on the first and third days by hæmorrhage. She had vomited four times on the day of admission, but not before. The abdomen was slightly distended but scarcely moved with respiration. The left rectus was rigid, and the lower half of the left side. Great tenderness was complained of all over the abdomen. The flanks were resonant. The pulse was 120, and the temperature 102° F. A tender swelling could be felt per vaginam in the left fornix. Mr. Sargent, who successfully operated, found that the pelvis contained pus, whilst a sero-purulent fluid invaded the lower abdomen. The left Fallopian tube was of the size of a thumb; its walls were much thickened and it was distended with pus. The ovary contained a large cyst in which was a blood clot of the size of a Tangerine orange. The lower abdomen was washed out with saline solution. From the history of disturbed menstrual function it was thought that the blood clot might represent the remains of an ovarian gestation, but careful examination in the clinical laboratory did not confirm this idea.

The case was essentially one of peritonitis with much purulent effusion without any hæmorrhage. The occasional production of peritonitis by the extension of gonococcal infection directly to the peritoneum through the uterus and tubes is sometimes seen. Here the attack may be very acute and require prompt operation. In a recent successful case, seen with Dr. Fitzgerald, pus was escaping from highly inflamed tubes at the operation, a fortnight after the infection, and three days after the commencement of abdominal symptoms.

Another part of this subject—that of ectopic gestation and its rupture as a cause of the "acute abdomen"—introduces us to additional symptoms: those caused by the increasing accumulation of blood in the peritoneum and the effect of its loss from the circulation on the general state of the patient. The rapidity with which it is poured out and the effect of this are so great that the patient may die as suddenly as if a deadly poison had been taken. Luckily, most of the victims of this accident are not so quickly overwhelmed, and time is given for attempts at a rescue. It is not my intention to enter into a discussion of extra-uterine gestation, its varieties, diagnosis, modes of ending, etc., but simply to introduce the subject as it occurs in actual practice as a surgical emergency, so that you may be able to recognise and successfully treat it. Of the more severe cases of hæmorrhage I have selected one of rupture of a sac situated in the wall of the uterus in which symptoms were (as they usually are) very urgent, and the general state of the patient a somewhat desperate one. It is a rare position for the sac to occupy, but there is no means of ascertaining this in any case before the abdomen is opened, but the indications for operation are the same as in examples of the much commoner accidental rupture of a tubal gestation.

A married woman, aged 35 years, was admitted (house surgeon Mr. Bradford, dresser Mr. Wilkinson), under the care of Dr. H. Mackenzie on April 23rd, 1903, on account of acute abdominal symptoms. Her history was as follows: She was treated in a London hospital nine years before for "peritonitis" after a confinement. About a month previously she began to suffer from attacks of vomiting which came on especially after food, which she was unable to retain. There was also some indefinite

pain in the abdomen. A fortnight previously she attended the out-patient department and was treated for gastritis. The abdominal pain got worse, and at four o'clock on the day of admission she had a very severe attack which doubled her up and later completely prostrated her. She vomited several times and became very cold, pale, and collapsed. During the afternoon she fainted. She was brought to the hospital 13 hours after the onset of the severe pain. She had had five children, four of whom were still living—one died at the age of 6 years. The youngest was 18 months old. The last menstrual period was six weeks previously; one should have come on about a week before admission. She had always suffered from leucorrhœa, but during the past few weeks this had been worse than ever. On admission she was blanched, emaciated, and in a state of collapse. The abdomen was held rather rigidly, and was generally tender, especially in the lower part. In the left iliac region there was a rounded elastic swelling, and there appeared to be fluid in the lower part of the abdomen, and to a less extent in the flanks. The pulse was 120 and feeble, the respirations were 26 and sighing, and the temperature was 97·2° F. At 8 p.m. a median incision in the lower abdomen about 4 inches in length was made and the dark colour of the blood could be seen before the peritoneum was incised. When the abdominal cavity was opened there was an immediate gush of blood mixed with clots, and the hand was at once passed to the uterus and tubes. The left one was felt to be enlarged, and so was brought to the surface. The enlargement was found, however, to be due to a hydrosalpinx, so the uterus and tube were drawn up for inspection. The uterus was ruptured at a point on the fundus to the inner side of the place where the right tube joined it. The uterus was longer than normal; the opening was about 1½ inches in length and placed transversely. From it there protruded a fluffy mass of delicate moss-like tissue which filled the opening and bulged over the edges. From this place there was a constant oozing of blood. This was evidently placental tissue. It was removed with a curette, and the cavity from which it came was scraped out. The opening was then closed with a continuous Lembert suture. This apparently arrested all bleeding. The left tube was then removed, and the pedicle was ligatured with silk. The

intestines appeared pale, almost bloodless, and contracted. The peritoneal cavity was carefully cleansed of clots and free blood by saline irrigation and sponging, after which the abdomen was closed. Four pints of saline infusion were injected into the left median basilic vein during the operation with evident benefit. The patient slowly recovered from the shock of the operation and the large loss of blood. On the third she complained of abdominal distension and pain in the epigastric region due to acute dilatation of the stomach, for which the stomach tube was employed with lavage. Some distension of the abdomen continued for about three days, but the temperature continued normal, and the pulse about 100. Convalescence was slow, and she did not leave the hospital until June 29th.

In another patient the diagnosis was rendered difficult because of the history of the illness and the absence of clotting in the blood which had escaped into the peritoneum.

A woman, aged 31 years, was admitted (house surgeon, Mr. N. C. Carver; dresser, Mr. H. T. Grey) to St. Thomas's Hospital on April 14th, 1904. There was history of irregular periods, and a white discharge on and off between the periods, but general good health until April 8th. She was then seized with a severe internal pain, which was so bad that on the following day she was obliged to go to bed; it improved, but returned again severely on the 12th. It was most marked on the right side, running up to the right breast, and affected the right leg so that it was very painful to move. This pain started with the period which was a fortnight overdue. When the discharge ceased the pain went, but came on again when the discharge returned. Almost fainting, on admission she appeared a pale, anæmic woman. The abdomen was slightly distended and tender, and it was difficult to examine satisfactorily, as she held herself very rigidly. There appeared, however, to be more dulness in the right flank than in the left. On vaginal examination the uterus was found to be normal and freely movable, and a little retroverted; there was no fulness in Douglas's pouch or abnormality of the uterine appendages. The tongue was furred, but the bowels were acting. The pulse was 112 and the temperature 99° F. On the 18th she was again seized with pain in the right iliac region. The vaginal discharge recommenced, being of a red colour. She felt very faint. The

pain passed off during the night, and on the next morning her temperature was 100·2°, and on the following evening 101°. The history, character, and duration of the pain, with the rise of temperature, made it very probable that the appendix was diseased, whilst the account of the menstrual irregularities induced Dr. W. W. H. Tate to suggest the possibility of an extra-uterine gestation which was leaking into the peritoneum as a result of some rupture of the sac. On the 29th the operation by temporary displacement of the rectus was performed, and a diseased appendix was removed after the application of the clamp. As free blood was present in the peritoneum when it was opened, and there was some in the pelvis, the opinion expressed by Dr. Tate was confirmed, and rapid incision in the median line low down gave access to the pelvic organs. The right tube was thickened at one part, and from the ostium abdominale hæmorrhage was still proceeding. This was ligatured, and removed with the ovary. A tumour about the size and shape of a pigeon's egg was attached to the left broad ligament. This was excised, and proved to be an intra-ligamentous cyst with papillomatous growth inside it. The appendix was catarrhal, and was strictured near its base. The right Fallopian tube was enlarged and thickened, the ostium abdominale admitted a little finger, and its mucous membrane was rugose. The uterine end of the tube for a distance of 1 inch was normal; beyond this it was dilated, and contained a large clot which was attached to the upper and posterior part of the interior. No fœtus was found. The right ovary was cystic, and contained a recent corpus luteum, besides several old ones. A pedunculated cyst containing blood-stained fluid was attached to the right broad ligament. The incisions in the abdominal wall were closed without drainage, after the pelvis had been sponged and flushed with warm saline solution. A week later she complained of pain in the left side of the pelvis, and a hæmatocele gradually formed and suppurated, being opened per vaginam about three weeks after the operation. She left hospital quite recovered on June 4th, 1904.

This was, then, a case of tubal abortion, the loss of blood coming from the open mouth of the tube, whilst the unusual character of the pain was explained by the condition of the appendix. There was no sudden seizure, as in the case of the

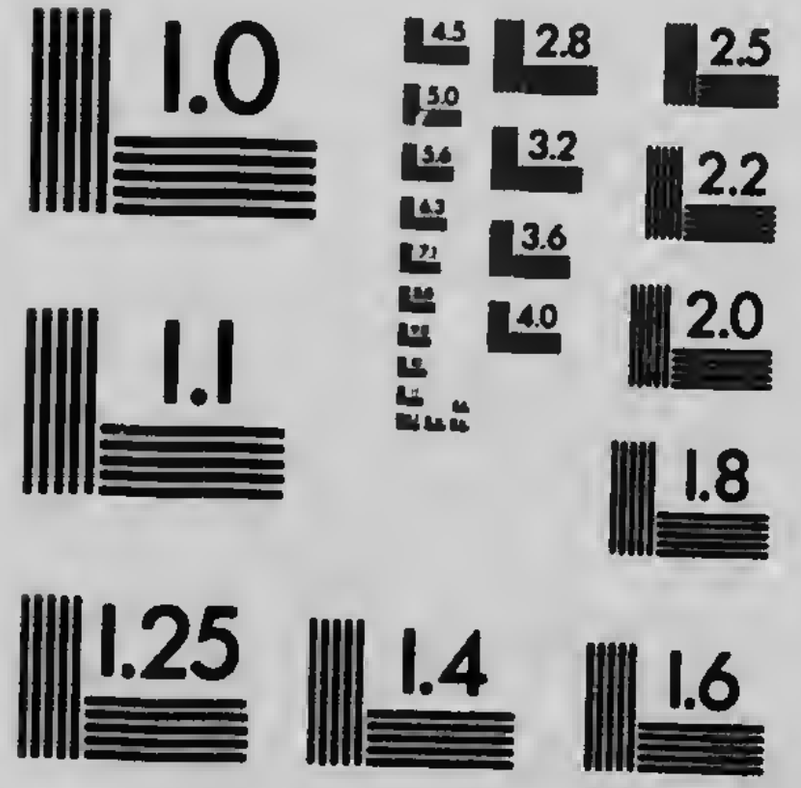
patient with intramural gestation; but the result would have been fatal ultimately, and I have quoted it as a contrast to the former example. In all these cases of operation for hæmorrhage the uterine appendages should at once be examined, and if anything abnormal is found brought out of the wound. No attempt to clear away blood clot must be permitted until the source of hæmorrhage is found and its flow arrested. Examine both sides, for there may be a ruptured sac in each tube. As a temporary measure it is advisable to apply clamps to the uterine end of the tube and to the broad ligament beyond.

The sudden onset of an appendix suppuration may simulate the bursting of the sac of an extra-uterine gestation, if menstrual irregularity and no marked rise of temperature are present. A sudden access of symptoms due to bursting of the abscess, with collapse, simulates a similar condition with renewed hæmorrhage. Some years ago I was called upon to go into the country at night to see a lady with an acute abdominal illness. The history was, that ten days before, when the period was a week overdue, she had had a severe attack of abdominal pain, with faintness and sickness, from which she had gradually rallied. This had been regarded by her medical attendant as probably due to the rupture of an extra-uterine gestation, but as she slowly improved he did not think that operative interference was called for. On the morning before I saw her she had been again suddenly seized with a similar attack of abdominal pain, and became collapsed. The condition of collapse continued when I arrived, and was extreme. The pulse was imperceptible, the temperature was subnormal, the extremities were cold, and the patient restless. On the following morning the condition was not improved, and, in fact, for four days she was so ill that it was not thought worth while to take her temperature. As a result of careful tending she recovered, so that on the seventh day after I had first seen her it was possible to open a large collection of pus which had been known to be present in the lower abdomen for the week, and which had not much increased in size. There was no blood clot in this, and, although the appendix was not found, it was regarded as the probable cause of the suppuration. During the gradual closing of the abscess an extension of it to the left of the umbilicus was especially slow in recovering, and pus could be

expressed from this part when everywhere else the condition appeared satisfactory. In this region adhesions formed between coils of small intestine, and I operated for acute intestinal obstruction due to them later in the year. Still later in the same year an attack of appendicitis made it advisable to remove the appendix. The patient has enjoyed good health since.

MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



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VI

SOME OF THE MORE RARE CAUSES OF THE ACUTE ABDOMEN

At intervals one meets with cases showing acute abdominal symptoms, such that a diagnosis of one of the diseases already described may be wrongly arrived at; yet on opening the abdomen the appendix, intestines, and stomach do not show any of the expected lesions, and search must be made for other possible causes of the symptoms. Acute pancreatitis or acute cholecystitis are perhaps the most likely of these. Very occasionally an acute dilatation of the stomach may be the cause of the acute abdomen.

Acute Hæmorrhagic Pancreatitis

In this disease the onset is sudden, and associated with severe abdominal pain, located usually in the upper abdominal and umbilical regions. The signs often suggest acute intestinal obstruction; at other times perforation of the stomach may be suspected. A history suggesting previous inflammation of the gall bladder or ducts is occasionally obtained. The following case is an example which recovered after operation. For the notes of this case I am indebted to Mr. E. W. Witney, house surgeon, and Mr. T. G. Cobb, dresser of the case:—

A widow, aged 57, was sent to my care at St. Thomas's by Dr. G. Brebner Scott, of Brixton, for an acute abdominal illness, on February 23rd, 1909. At six o'clock on February 22nd, 1909, she complained of great pain in the abdomen. She said that it began in the right side and spread rapidly to the left, and also extended upwards to the right costal margin. She was sick at the same time, and could keep nothing down subsequently. Her bowels had acted naturally the previous morning.

There was no history of biliary colic or of injury, and she

had been quite well until this illness. She was a well-nourished woman, who still complained (at 6 p.m. on February 23rd) of abdominal pain. This was now general all over the abdomen. She looked ill, had a pulse of 110, and a temperature of 101°. The abdomen was distended, generally hard to the touch, and very tender, but not specially so in the iliac fossa. On percussion there was patchy dulness, both in front and on the lateral aspects of the abdomen, but not in the flanks. No abnormal swelling could be felt, but the wall of the abdomen was fat; it was distended and resistant. Her tongue was dry, and bowels not acting. Operation was decided upon, and an incision made on the right side through the rectus muscle. When the peritoneum was opened a good deal of blood-stained fluid escaped. There was no lymph on the peritoneum, but the omentum appeared somewhat thick and infiltrated, whilst in more than one spot there was fat necrosis. The pancreas appeared harder than usual, and enlarged. The gall bladder was normal; no stone could be felt either in it or in the biliary passages. The small intestine on the right side was distended. The peritoneum was washed out with normal saline solution, and the incision closed. She was relieved by the operation, but on the following evening her temperature rose again to 100° and pulse to 136, so at my request the incision was reopened by Mr. J. E. Adams, who confirmed the condition of fat necrosis, evacuated more fluid, and put in a drainage tube. The following day Cammidge's test (*c*) was reported as positive. The patient was very ill for some days, and at one time appeared very flushed, weak, and despondent. Drainage was continued until March 10th, after which she gradually improved. It is not necessary here to give any further details of the case. She left hospital on April 20th, and has since had good health, having quite recovered.

This is the only successful case of operation for acute hæmorrhagic pancreatitis that I can record, but it is fairly typical of the disease as found in actual practice. I have now seen several cases which practically group themselves so that one can give an average description of fair accuracy when they are met with within forty-eight hours of the commencement of the attack.

The patient is commonly an adult of more than 40 years

of age, well nourished and even fat, apparently in good health until seized with a sudden attack of severe abdominal pain. On examination the abdomen has been more resistant generally than it should have been, but not rigid. There has been a diffused superficial tenderness, especially on unexpected light palpation, the general resonance over the abdomen has been rather patchy in character, whilst the movements during respiration have been good. In all, the pulse has been rapid, there has been anxiety, and not infrequently a flushed face.

If the abdomen is opened within 24 hours, the amount of blood-stained fluid will be small, and may be supposed to have come from the wound; again, at this stage, it may be difficult to find any points of fat necrosis. In any case in the adult where nothing is found in the more usual places to account for acute abdominal symptoms, search should be made for these areas, which are yellowish white in colour and of small size. If nothing is found to account for the state of the patient, then it may be well to put in a drainage tube for a few hours at all events, for a discharge of a red colour will soon come away, having a peculiar mawkish smell which, so far as I know, resembles nothing else. There may be no evident swelling of the pancreas. These patients are not good subjects for abdominal section, and I believe you will get better results in most cases from simple drainage, than from a more elaborate operation, such as incision of the pancreas, etc., possibly with drainage of the gall bladder. Most of them will not stand the additional manipulations required, with the prolongation of the period of anæsthesia; it is possible, however, to do much more if the patient is in fair condition, and not too fat. The ideal operation is to incise the pancreas, with due regard to the duct and main vessels, and establish a direct route for drainage; unfortunately the action of the secretion from the gland, if much escapes, is very destructive on the tissues with which it comes into contact, and if the flow is profuse you will find it difficult to prevent actual digestion of parts.

Acute Dilatation of the Stomach

This is a rare condition, whose origin is sometimes doubtful, at other times it follows an operation involving the peritoneum.

An attack starts with copious fluid vomiting, epigastric pain and distension, which becomes general; the action of the bowels is irregular; signs of extreme collapse are present. Towards the end of a severe case complete atony of the stomach may lead to cessation of the vomiting.

Of physical signs, the most valuable, when it is present, is succussion, but it is important to remember the possibility of the occurrence of such a condition in the acute abdomen.

Unless relieved by evacuation of the stomach contents it usually proves rapidly fatal. The extreme distension of the abdomen and generally severe condition may lead to a diagnosis of acute peritonitis, or if there is constipation intestinal obstruction may be thought to be present.

I will give two contrasting examples, one occurring in the course of an acute pulmonary attack, the other secondary to an abdominal operation and associated with general intestinal distensions.

Case 1.—On January 21st, 1903, I was asked to see R. T., aged 15, with Dr. Michael Bulger. The history of the case was as follows: Dr. Bulger was called to see her on the 19th, when she complained of pain under the left breast on breathing, which was increased by taking a deep breath; there was slight expectoration tinged with blood. Over the painful area there was some dulness, increased vocal resonance, and crepitation on respiration. On the 20th the patient was much easier. Temperature 102°; pulse 96; could take food easily, bowels acting. She was the subject of angular curvature of the dorsal spine, the result of old tuberculous disease.

On the 21st she began to vomit about 7 a.m., the vomited material being of a bilious character, and yellow in colour. The bowels acted at 8 a.m. The pain in the side was much better, but the constant vomiting masked all other symptoms. Temperature, 99°; pulse, 80. Nothing relieved the sickness. The abdomen was retracted, dull all over, and without tenderness on pressure. At 6 p.m. she was rather collapsed, the vomiting continued, and now she was bringing up a black, tenacious fluid. She had complained of no pain since the vomiting came on, but the abdomen was becoming distended. About 11.30 p.m., when I saw her with Dr. Bulger, the abdomen was somewhat distended

but not markedly so, dull on percussion all over the front and down the left flank to Poupart's ligament. No dulness was present in right flank. A well-marked thrill of fluid could be felt in the lower part, and to the left. There was no rigidity. Her pulse was rapid, face pale and sunken, tongue black and dry, whilst there was frequent vomiting of a black, tarry fluid.

An incision in the middle line showed a greatly distended stomach, the lower margin of which passed down to the pubes; it was bluish in appearance and flattened. All the intestines were empty. There was no free fluid. Distension apparently ceased at the third part of the duodenum, and no pressure could empty the contents of the stomach along this part. A tube was put in, and the opening sutured to the abdominal wall. Much fluid was drained off from the stomach by this tube, and vomiting ceased; but very little relief was afforded, and the patient died on the following day from exhaustion.

Case 2.[1]—A woman, aged 27, came under my care at St. Thomas's Hospital, sent to me by the late Dr. Heath, of St. Leonards-on-Sea, on November 7th, 1901, for a swelling in the abdomen, which had been noticed to be increasing for the last nine years. On November 12th a cœliotomy was performed, the diagnosis of ovarian cyst confirmed, and the tumour removed in the usual manner.

On the first and second days after the operation the patient's pulse was about 110, and temperature rose from 101° to 103° F. The abdomen became increasingly distended; there was no vomiting beyond that directly following the anæsthetic. A week after the operation there was evidence of slight suppuration in the abdominal wound, and pus was evacuated with a director. There continued to be great distension of the abdomen and much discomfort.

I am indebted to Messrs. G. A. C. Shipman, S. Hunt, F. J. Child and T. W. H. Downes, house surgeons, and to Mr. G. T. Birks, dresser, for much assistance in this case.

On November 21st, Dr. C. R. Box saw the case with me. The epigastric area was then very prominent and a ringing coin sound could be obtained over this area and extending downwards to the iliac crests; marked succussion was elicited on shaking the

[1] See *Lancet*, 1903, Vol. I., p. 1031.

patient; there was no vomiting. Lavage of the stomach was commenced and carried out twice daily from this time. Twenty-six days from the operation parotitis developed, associated with a septicæmic temperature and severe diarrhœa, and for some days this was uncontrollable. Antistreptococcic serum was given; a marked rash followed two days after its administration, but it was without apparent effect on the disease. The distension of the abdomen did not appreciably diminish, and with a high temperature, and the diarrhœa, it continued for about three months; much œdema of both legs and the lower part of the abdominal wall supervened. Some peristalsis in the region of the umbilicus was occasionally seen, and the stomach still showed the physical signs of dilatation.

On August 12th, 1902, the gastro-intestinal functions had become practically normal, the œdema in the lower part of the body, due presumably to thrombosis of the inferior vena cava was still present and the patient left the hospital. Seen again in January, 1903, her general health was good, though evidence of thrombosis persisted, there being some œdema of the ankles with dilatation of the veins over the lower part of the abdomen.

The subsequent history of this case is very interesting. She was readmitted to St. Thomas's Hospital under my care on November 19th, 1907, for another abdominal swelling. Mr. G. M. Huggins was house surgeon, and Mr. F. R. Thornton dresser to the case. It was stated that her general health had been good until a fortnight before, but that during that time she had suffered from pain in the stomach and swelling but no vomiting. The abdomen was a good deal distended and tense on admission, the superficial veins dilated, chiefly in the lower part, and there were numerous lineæ albicantes in the same region. A dull rounded area was present reaching almost to the umbilicus from the pelvis. This was fluctuating and tender, whilst around it the intestines were distended and tympanitic. Her temperature was slightly raised. She was kept in bed for some time in order to give the inflammatory state a chance of quieting down, but the distension did not appreciably diminish. On December 4th an incision to the left of the mid line was made, and an inflamed ovarian cyst removed. The pedicle was long and had been twisted three times from left to right. The cyst was very adherent to the omentum,

but not suppurating. It was an ordinary multilocular cyst. The gut was very much distended, the sigmoid being about 5 inches in diameter when examined in the wound. It was not punctured, as the condition was regarded as temporary in character.

Much flatulent distension of the abdomen continued not involving the stomach; many remedies were tried, but until the employment of the interrupted current late in December no definite effect appeared to have been produced by them, but the distension suddenly subsided on the 25th of that month. There was no suppuration or rise of temperature after the operation.

The unusual amount of distension of the intestines present at the time of the second admission, and the difficulty in getting rid of it after operation is especially interesting in a patient with this history. On this occasion there was no suppuration either before or after operation, yet the distension was extreme, and suggested that the nervous element was an important factor in its causation. The rapid recovery on the use of the interrupted current confirms this view. We know how marked the "reflex" effect may be sometimes of an injury to the abdomen unattended with obvious lesion, also the great distension which may ensue on the mere application of a ligature to the neck of a hernial sac in the operation for radical cure. In one patient a condition of rapid distension of the abdomen with pain, vomiting and a temperature of 103·6° ensued with a collapse which excited alarm. Appropriate remedies soon produced a change for the better and the case ran the usual aseptic course.

These cases are both of them examples of acute dilatation of the stomach but present many points of contrast. In the first the stomach had become a mere fluid-containing sac with a thin wall, which at the time of the operation was lying over the front of the intestines and gave a dull note on percussion across the middle line, an area which is resonant in all other conditions of the acute abdomen. There was most certainly no gaseous accumulation, and until quite the last stage there was no distension of the abdomen. It is difficult to account for it, unless we accept the suggestion that it was a paralysis due to some toxic condition associated with the patch of inflammation of left lung found by Dr. Bulger, when he first saw the patient. Spinal

deformity has been noticed in other cases of acute dilatation, but when not associated with the application of a plaster jacket it is difficult to understand how it could have much influence on the production of such an acute and fatal affection.

Dr. W. B. Laffer[1] collected a series of 217 reported cases, and of these 38·2 per cent. followed operations, usually one on the abdomen. The notes of this second case were published by Dr. Box and myself on account of its rarity, and as an encouragement in the treatment of such desperate conditions. We are inclined to put its occurrence down to some toxic absorption from the wound, although the amount of suppuration was neither acute nor extensive. It is probable that she owed her recovery to the fact that her distension was general and not absolutely confined to the stomach and duodenum. Dr. Laffer, from an analysis of his series of cases, writes: "The pathology and modus operandi of acute dilatation of the stomach and gastro-mesenteric-ileus is not definitely known, but the experimental, clinical and pathological evidence points to a primary innervation disturbance affecting the gastric nerves or their centres in the brain or cord. It has not been proved that the compression of the duodenum by the root of the mesentery is the primary cause of the so-called arterio-mesenteric ileus."

Embolism and Thrombosis of the Mesenteric Vessels

This is very rare. The results which follow obliteration of the vessels in the mesentery are the same whichever vessel becomes first affected. Gangrene of the gut invariably follows. A man between 30 and 60 years old has an abrupt onset of sudden intense pain in the abdomen, followed quickly by vomiting and collapse, peritonism is well marked. If diarrhœa is present the motions are frequent and blood-stained; if constipation, then nothing, not even flatus, is passed. The abdomen is distended, rigid and tender. Sometimes free fluid is present. The temperature is often subnormal, the pulse rapid and of bad quality. In the second smaller group the origin is insidious and the progress varies. A diagnosis of intestinal obstruction may be made, but the true condition is only found at the post-mortem

[1] "Annals of Surgery," Vol. II., 1908.

examination Gerhardt gives the following as necessary for a diagnosis: (1) The presence of a source for the embolus; (2) Copious intestinal haemorrhages, not to be explained by disease of the wall of the bowel, or by impediment to the portal circulation; (3) A rapid and marked fall of temperature; 4. Colicky pain in the abdomen; (5) The simultaneous or previous occurrence of embolism in other parts; (6) the occasional presence of tumour in the abdomen, due to the infiltration of the mesentery with blood. All of these signs are not, however, present in every case. Valvular disease is found on examination.

The operative treatment consists in a resection of the part of the bowel that appears involved in the process of gangrene, and the formation of an artificial anus. This is done (1) because in resection of a portion of gut the line of suture, if enterorraphy is to follow, must be in sound bowel, and it is always doubtful in these cases if the gangrene will not spread; (2) The full operation would in most instances take too long when consideration is paid to the grave state of the patient.[1]

Peritonitis arising from Disease of the Gall Bladder

Symptoms of peritoneal involvment of variable extent arise either from perforation of the gall bladder, or from its being in a state of phlegmonous or gangrenous inflammation. A history of previous attacks of biliary colic, perhaps associated with jaundice, may very likely be given.

The pain in typical cases will be localised in the gall bladder region, but it may extend to the umbilicus, to the appendix region, or become generalised, in accordance with the extent of the infection. Referred pain in the right shoulder is uncommon. Confusion in diagnosis with acute appendicitis or perforation of a duodenal ulcer is likely to arise. The following is an example of the former type of case:—

On the evening of November 17th, 1902, I was requested to see a patient, aged 58, with Drs. Harper and Godfrey, of Finchley. Two days before, he had been taken with severe paroxysmal abdominal pain accompanied with vomiting.

He had had three other attacks of abdominal pain, the first

[1] *See* Moynihan, "Abdominal Operations."

two years previously. None of them had been followed by jaundice, although the pain was always in the region of the gall bladder, and they were regarded as biliary colic. The present attack began during the night of Saturday, the 16th, and resembled the other attacks. On the 18th he felt so much better that he went into the city to business. In the evening he came home earlier than usual, and sent for Dr. Godfrey, who found him again complaining of pain in the abdomen, with a temperature of 101°. On the following morning he was worse, and during the day he had occasional vomiting, the abdominal pain continued to be severe and gradual distension came on, whilst his expression became changed to that associated with serious abdominal disease.

When I saw him about 11 p.m. he had a greyish look and appeared distressed. There was occasional vomiting. His pulse was 84 of fair strength. The abdomen was distended and did not move well with respiration. It was tender on pressure, especially on the right side below the ribs, the area of most marked tenderness being midway between the ribs and the iliac fossa. The liver dulness was not increased, but there was some dulness below in the right flank difficult to define, as the man was very fat. The bowels had acted twice during the day. He was evidently suffering from peritonitis, but I could not decide what the origin of the trouble was. Dr. Godfrey inclined to the gall bladder as the cause, having seen the earlier attacks of pain; my opinion was given in favour of the appendix as the origin of his trouble. Incision over the iliac fossa showed that to be healthy, whilst there was pus along the colon coming from above where the intestine was covered with lymph. A second incision over the gall bladder showed a recent peritonitis around it with pus, not definitely localised. The area affected was cleansed, and the gall bladder examined. It was small, not distended, but presented a small perforation near the fundus. No stone could be felt, but the condition of the patient under the anæsthetic was bad, and it was imperative to finish the operation as soon as possible. The gall bladder was therefore packed off with gauze, and a tube introduced above the plug down to the opening in the gall bladder. The patient recovered and was well in 1909, not having had any return of symptoms in the interval.

The cases may be very acute in their course, and early operation affords the only chance of success. The peritoneum fills very rapidly sometimes from this source, and as a rule there is very little in the previous history to point to the presence of gall stones in the gall bladder, as they are usually of large size, giving very little inconvenience to the possessor until ulceration has taken place over them and extended through into the peritoneum. Occasionally the symptoms may not be of this acute character. A patient under my care in 1908 was admitted for supposed intestinal obstruction. He was a feeble old man, who had been losing flesh and strength for some time whilst the abdomen had gradually become distended for a week or ten days before admission, during which time he had also had a little vomiting and constipation. On admission the abdomen was distended, it contained a large quantity of fluid, and the man was emaciated and rather yellow in appearance. He appeared apathetic, had no pain, and at this time was not vomiting, but from the history it was supposed that he might have incomplete malignant obstruction of the large bowel with secondary growths about the peritoneum and in the liver. Nothing abnormal could be felt per rectum. His pulse was not more than 70; his temperature was normal. An exploratory operation was done and the peritoneum found to be full of bile-stained fluid. Search was made for a possible cause of obstruction, but the intestine was nowhere distended and no growth could be felt. Some lymph was seen in the region of the gall bladder, and amongst this lymph was an opening which led into the gall bladder, in which there were some gall stones. The patient did well for a few days after the operation and then rapidly sank and died. It is possible, therefore, to get very large accumulations of fluid in the peritoneum after perforation of the gall bladder without the production of much disturbance. This is well known where there has been a traumatic rupture of the gall bladder or bile duct, but a fatal peritonitis is the usual consequence when the contents of the gall bladder have escaped through ulceration in gangrene of the wall of that viscus, a process in which micro-organisms are very active.

VII

SOME NEUROSES WHICH MAY CAUSE SYMPTOMS OF URGENCY

Hæmorrhage from the Stomach

No surgeon has any doubt that operative treatment is sometimes absolutely necessary in hæmorrhage from gastric or duodenal ulcers. It may be the only means of saving life but the indications for its performance should be clear and definite. In some cases it may be possible to find and deal with the exact cause of the hæmorrhage; in others it will only be possible to treat the distension of the stomach (by gastro-enterostomy) on which the occurrence of the bleeding so frequently depends. It may be the wiser plan, when possible, to perform the operation of gastro-enterostomy although the local trouble has also been directly treated.

In dealing with these cases it may be advisable to remember the possibility of the hæmatemesis being of hysterical origin, for such a condition is always amenable to medical treatment, and in my opinion should not be submitted to operation under any circumstances. The history of the case given below not only proves this, but shows in a marked degree the ills that may follow such ill-advised interference.

A woman, aged 29, was sent to me by Dr. Frank Boxall of Rudgwick, in September, 1902, for varicose veins of the left leg, which were causing her pain when standing. She was admitted to St. Thomas's Hospital (Mr. T. Guthrie was house surgeon), and Trendelenberg's operation with excision of some of the more prominent veins in the calf performed.

In her past history it was stated that she had been in another hospital a short time before for symptoms which were regarded as indicating the presence of a gastric ulcer. One night she developed acute symptoms, which were supposed to have been

due to perforation of the ulcer, and an exploratory incision was made in the epigastric region by a surgeon, who found nothing but a normal state of the stomach; there had been no perforation.

From the history this was supposed to have been hysterical. During her stay with us this opinion was confirmed by the fact that in the earlier days after her admission, when she was looking somewhat anxious in the face, she again gave an exhibition of perforation. She complained of acute pain in the epigastrium, the upper abdomen became suddenly distended, and the muscles appeared tense. There was, however, no change in her appearance, the pulse-rate, or temperature, and other symptoms were not in agreement with perforation; we had also the history to go upon.

This patient left St. Thomas's about a fortnight after the operation for the veins, but returned in 1904 on account of hæmatemesis. She was vomiting daily large quantities of fluid, in which there was a good deal of blood of dark colour, evenly diffused. In spite of the fact that this continued for a month without cessation, she showed no signs of anæmia, and always presented a smiling face to the world. No particular drug was given to arrest the bleeding, which was regarded as of hysterical origin. When the hæmatemesis had ceased for a few days and she had become bright and cheerful she was sent home.

In about three months time she was sent back to the hospital with another attack of hæmatemesis of similar character, from which she recovered in from 3 to 4 weeks, and returned to her home quite well.

It was some months before anything further was heard of her, but she had not been altogether idle. It appeared that she had again developed hæmatemesis when the influence of the hospital had passed off, and this time her friends sent her to a hospital "where there was a surgeon who would operate."

Her next admission to St. Thomas's was on July 19th, 1905 (Mr. Vaughan was the house surgeon and Mr. G. M. Custance the dresser) when she was found to have a fæcal fistula, which communicated with the transverse colon and was situated at the lower part of a scar, through which, it was stated, her stomach had been operated on. We were informed by letter that although no ulcer or cause for the hæmorrhage was found at the examination, it

was thought by the surgeon that there was an ulcer in the duodenum. She said that after the operation she did very well until the tenth day, when it was found that the milk which she was taking came through into her dressings. A second operation was done and the milk no longer came through the wound, but in ten days' time fæcal matter appeared when she took medicine, and fæcal fluid came through if she had an enema administered.

The abdomen was opened in the middle line below the old scar and a lateral anastomosis of the large bowel above and below the fistula done. There were many adhesions. Recovery from this operation was quite uneventful, the fistula was allowed to close and, when she left the hospital, was about the size of a wooden match. She left at her own request.

Readmission was sought January, 1906, because she said that the escape of gas from the fistula was troublesome and caused offence to patients when she was nursing them.

There was now a fistula about the size of a cedar pencil, and as the bowels were acting well there appeared no reason why this should not be permitted to close. Accordingly a dressing was placed over it, and secured in position by means of broad strips of rubber strapping. The fistula closed to some extent, but we could not feel sure that it was not kept open in some way by mechanical means at the command of the patient. A smaller dressing was then applied, and this was covered and held in position by means of collodion. After this was applied she complained of excruciating pain and said that she could not possibly bear the agony of it. It was not, however, removed for a week, when the fistula had completely closed. I may perhaps mention that the fistula was found to have become distinctly larger after she had had a bath without the presence of a nurse; this was before the collodion was applied.

We were for a time under the impression that the case was now completed, but in March, 1909, she again came into the hospital during the cleaning of a charitable institution to which she had gained admission. A fæcal fistula had formed at the site of the former one, and she refused to have anything done with a view to closing it. When questioned as to the formation of this fistula she said that an abscess had come and burst, leaving the fistula behind it, but there is a strong possibility that it

did not form in this manner. If it had been closed, and this would soon have occurred under simple treatment, for there was a free normal passage for the fæces, she would no longer have been eligible for the institution in which she had now been received.

I may add that her expression was that of a neurotic, and the diagnosis of hysteria was confirmed in many ways.

It was surely unnecessary to perform a gastrotomy for the relief of hæmatemesis in a case with this history. Gardini (*Clinica Moderna*, May, 1905; *British Medical Journal*, Epitome, August, 1905) has given the account of a case of similar origin. A girl of 22 had suffered from gastric symptoms for six years, and almost daily vomiting of blood for five months or more; in that instance the mucous membrane of the stomach is said to have been tinged, hypertrophic and of a red colour, but there was no evident cause for the hæmorrhage. The patient was apparently cured by the operation. Gastric hæmorrhage has sometimes a purely nervous origin; sometimes it is simply a form of vicarious menstruation, and has a relationship to the menstrual periods, as well as to emotional and constitutional disturbances and injury (*loc. cit.*).

Enterospasm

By this term is now recognised a condition in which there is a spastic contraction of the muscular wall of some part of the intestines; there is no obvious structural change in the bowel, and the phenomena are usually regarded as being dependent upon some abnormal action of the nervous mechanism.

The spasm may give rise to symptoms of varying intensity, from those of chronic constipation to such as simulate acute intestinal obstruction.

Dr. Hawkins drew attention to the condition in 1906,[1] and I will quote from some of the conclusions he then set down.

Symptoms usually manifest themselves in patients during the active period of life; they appear with about equal frequency in the two sexes. The individuals affected are usually of a neurotic type and often of sedentary habits.

[1] *British Medical Journal*, January 13th, 1906.

Opportunity for direct observation of the spasm of the bowel does not often occur, but Dr. Hawkins thinks that the colon is more often affected than the small intestine. The pain in the subacute cases is sometimes localised in the right iliac region and so appendicitis may be simulated.

I need here only consider the severe cases giving rise to symptoms which suggest the necessity of immediate operative interference. Sometimes the resemblance of the condition to intestinal obstruction of organic origin or even to general peritonitis may be so close that the mind of the observer is left in doubt as to the right diagnosis, and exploration of the abdomen will be the only sound course to pursue.

Points which will be helpful in arriving at a decision are, the presence of the trouble in highly-strung, nervous individuals, with a history of previous attacks of abdominal pain similar in character which have passed off without operation.

In a recent case operated on for me by the resident assistant surgeon, Mr. L. Norbury: The patient was a woman of 40, for whom I had removed gall stones about two years previously. Her symptoms were those of acute intestinal obstruction, and the spasmodic contraction affected much of the small intestine. She is a typical neurotic in appearance. I have met with the condition as a localised affection of the splenic flexure in more than one instance. Here the patients have been overworked and anxious men of over 45 years of age.

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